URGENT SEDIMENT REMOVAL PROJECT COMPENSATORY WETLANDS MITIGATION AND MONITORING PLAN LOS CAPITANCILLOS FRESHWATER MITIGATION SITE AND POND A-8 TIDAL WETLANDS MITIGATION SITE

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SANTA CLARA VALLEY WATER DISTRICT URGENT SEDIMENT REMOVAL PROJECT COMPENSATORY WETLANDS MITIGATION AND MONITORING PLAN

LOS CAPITANCILLOS FRESHWATER WETLANDS MITIGATION SITE AND POND A-8 TIDAL WETLANDS MITIGATION SITE

DEPARTMENT OF THE ARMY PERMIT NO. 22038S

Prepared by

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686

Environmental Resources Management Unit
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Project No. 000407 (1997-98)
Project No. 000413 (1998-99)

Submitted June 8, 1998

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EXECUTIVE SUMMARY

This mitigation and monitoring plan has been prepared for the Urgent Sediment Removal Project by the Santa Clara Valley Water District. The Plan satisfies the requirements of Department of the Army Permit No. 22038S, California Regional Water Quality Control Board Waste Discharge Order No. 97-094, California Department of Fish and Game and environmental review under the California Environmental Quality Act to provide mitigation for sediment removal work authorized in 1997 in tidal and nontidal stream reaches. The permits for the Urgent Sediment Removal Project provide for the removal of 1.0 acre of wetlands along 2.4 miles of nontidal streams and 8.9 acres of wetlands along 4.1 miles of tidal streams. The Urgent Sediment Removal Project represents a portion of maintenance work that is expected to occur under the 10-Year Stream Maintenance Program, which is in preparation. The mitigation project will provide acreage in excess of wetland acreage required for the Project. It is expected that the mitigation and monitoring plan will also provide mitigation credits for the 10-Year Stream Maintenance Program or other District projects.

This document describes a plan to provide functions and values equivalent to 10 acres of tidal brackish wetlands and 0.6 acres of freshwater nontidal wetlands in accordance with the Department of the Army Permit. Mitigation for tidal wetland impacts will be accomplished by restoring 25 acres of a Cargill Salt Division salt concentrator pond to tidal wetland. An existing levee between Guadalupe Slough and salt concentrator pond A-8 will be breached to provide full tidal action in a diked area. Because the existing pond surface elevation is at approximately -3.0 feet National Geodetic Vertical Datum, approximately 4 feet of sediment accretion is needed to restore the surface to the lowest elevation at which vegetation becomes established. The marsh plain will be restored to the level of approximately mean higher high water by natural sedimentation. The functions associated with tidal brackish marsh in the South Bay are expected to develop over a 15-year period as the marsh plain aggrades.

The preliminary plan for the nontidal site entails the creation of off-stream freshwater seasonal or perennial wetlands adjacent to Guadalupe Creek. Approximately 5 acres of jurisdictional acreage will be created by excavating an upland site and providing water from the Almaden Valley Pipeline. A portion of this acreage will be allocated to address impacts to 0.6 acres of freshwater wetlands resulting from the Project. Planting will consist of locally occurring native hydrophytic species. Water control structures will allow for adjustments to be made in the depth, duration and timing of water.

The mitigation and monitoring plan provides for one-time mitigation for the work described under the permit and does not establish precedence for mitigation ratios for similar work in the future.

PART I. URGENT SEDIMENT REMOVAL PROJECT

1.0 PROJECT DESCRIPTION

Part I provides a summary of the Santa Clara Valley Water District's (District) Urgent Sediment Removal Project (Project) (Thomas Reid Associates [TRA] 1995) for which this mitigation and monitoring plan (Plan) has been developed. Project work was authorized in 1997 under the U.S. Army Corps of Engineers (Corps) Permit No. 22038S (Permit), California Regional Water Quality Control Board Waste Discharge Order (Order) No. 97-094, California Department of Fish and Game Project-Specific Addendum No. 1 to Memorandum of Understanding No. 331-89 and is prepared in accordance with the Project California Environmental Quality Aet review (TRA 1996). This plan addresses requirements of the Permit and Order to provide functions and values at least equivalent to 0.6 acres of freshwater habitat and 10 acres of tidal wetlands. It is expected that the mitigation project described here will also provide mitigation that can be credited to compensate for future impacts associated with the 10-Year Stream Maintenance Program (Program) or other District projects.

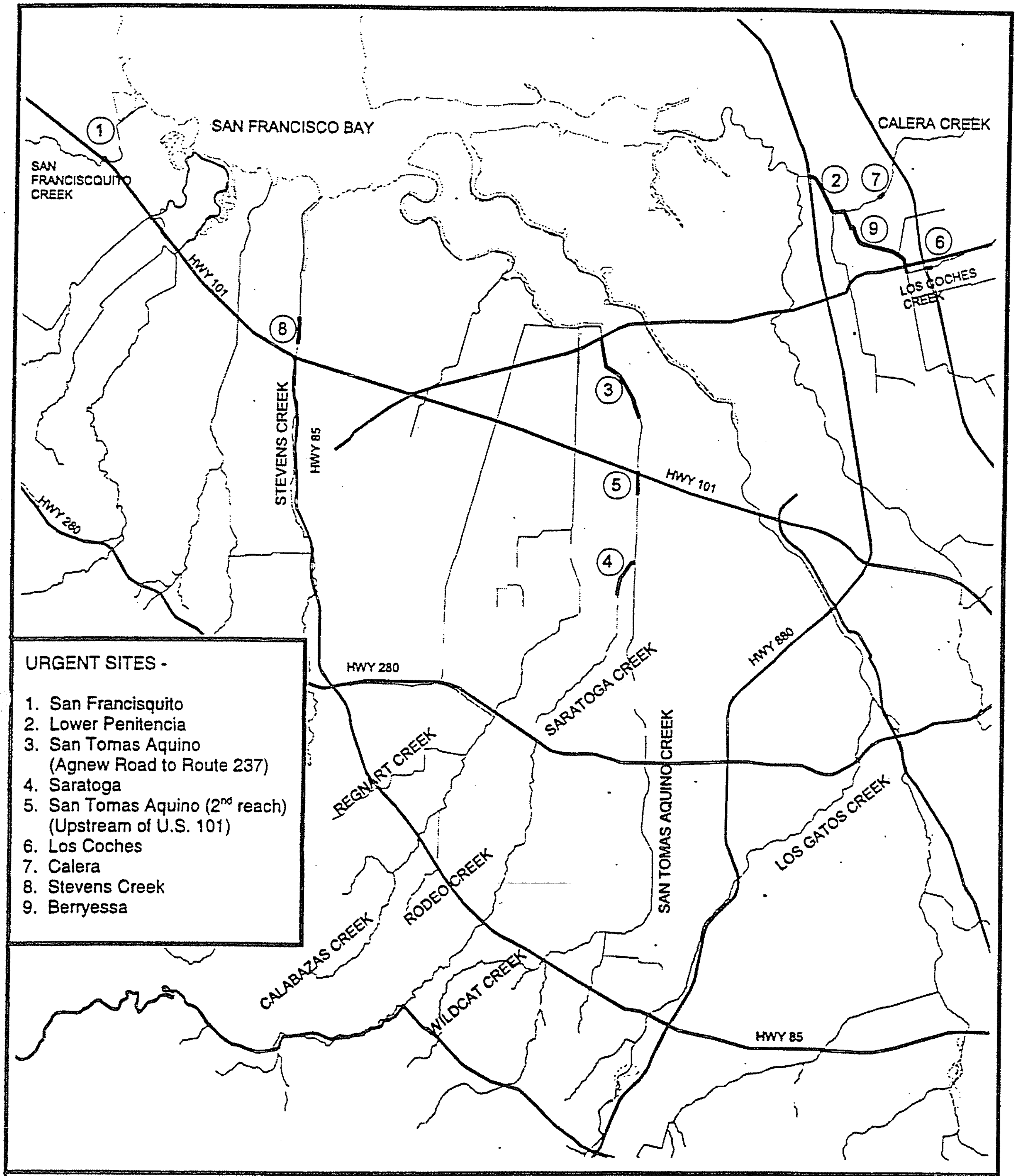
This document includes plans for both nontidal and tidal wetlands. The preliminary compensatory Plan for nontidal freshwater wetlands constitutes Part II and is being submitted, in accordance with the 1997 permit conditions, for the first time. The preliminary plan identifies a site for mitigation and provides a conceptual framework for mitigation goals and site design. Details of the plan will be developed during the next phase of the project, which will result in a planning design that identifies the project's specific design features. The tidal wetlands plan constitutes Part III of this document, and is a revision of the document "Preliminary Compensatory Wetlands Mitigation and Monitoring Plan" (District 1997) submitted with the permit application for the Project. The revision provides a more detailed description of the plan for tidal wetlands.

1.1 Location of Project

The Project is located in northern Santa Clara County, California (Figure 1). The 1997 project included work on the nontidal reaches of Calera, Los Coches, San Tomas Aquino, Saratoga, and Stevens Creeks. Work was conducted on tidal reaches of the following four creeks: San Francisquito, San Tomas Aquino, Berryessa, and Lower Penitencia.

1.2 Summary of Project

The purpose of the Project was to restore the design flood capacity within nontidal and tidal stream reaches by removing sediment and associated vegetation. The Project entails the removal of 1.0 acres of wetlands along 2.4 miles of nontidal creeks (Table 1) and 8.9 acres of wetlands along 4.1 miles of tidal creeks (Table 2).



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SAN JOSE, CA 95118-3686

Figure 1.

Urgent Sediment Removal Project
Vicinity Map

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TABLE 1. Urgent Sediment Removal Projects in Nontidal Areas

Creek and Station Number	Location	Project Length (miles)	Work Area	Area of Wetlands Impacted (acres)
Calera 32+20–38+00	Downstream Escuela Parkway drop structure to Escuela	0.10	Widen meandering low-flow channel	0.09
Los Coches 23+00–18+00	Upstream Highway 680 to South Park Victoria Avenue	0.09	Entire channel bottom	0.18
San Tomas Aquino[1] 150+00–209+00	Upstream Highway 101	1.14	Entire channel bottom	0.26[2,3]
Saratoga 0+00–64+00	Upstream San Tomas Aquino Creek	0.60	Entire channel bottom	0.22
Stevens 110+00–133+00	Downstream L'Avenida	0.44	Low-flow channel on left side of creek	0.25[3]
TOTAL		2.37		1.01

[1] Work partially completed in 1997; remainder to be completed in 1998.

[2] 0.2 of the 0.26 impacted acres resulted from a work area extension authorized by a Letter of Modification from the Corps. The Letter of Modification requires that the additional 0.2 acres are to be included in the calculation of mitigation developed for the Program.

[3] No off-site mitigation was required for 0.06 acres of wetlands on San Tomas Aquino Creek or 0.25 acres of wetlands on Stevens Creek (TRA 1996).

TABLE 2. Urgent Sediment Removal Projects in Tidal Areas

Creek and Station Number	Location	Project Length (miles)	Work Area	Area of Wetlands Impacted (acres)
San Francisquito 73+00–77+00	Downstream Highway 101	0.09	Gravel bar on one side of channel	0.10
San Tomas Aquino[1] 27+00–105+00	Upstream Highway 237 to upstream Tasman Drive	1.48	Opposite side of channel from low flow	5.20
Berryessa 0+00–93+50	Penitencia Creek to Los Coches Creek	1.80	One side of channel	1.77
Lower Penitencia 10+00–45+90	Upstream Dixon Landing Road, Milmont Drive to California Circle	0.70	High-flow channel (on one side of creek and separated from rest of creek by raised maintenance road)	1.83
TOTAL		4.07		8.9

[1] Work partially completed in 1997; remainder to be completed in 1998.

1.3 Responsible Parties

The Project contact is Mr. Jose Ortiz, Supervising Engineer, Technical Support Services Unit. Ms. Gale Rankin, Botanist, Environmental Resources Management Unit, is the contact for the nontidal wetlands mitigation plan. The contact for the tidal wetlands mitigation plan is Ms. Louisa Squires, Wetlands Specialist, Environmental Resources Management Unit.

The District address is:

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5750 Almaden Expressway
San Jose, CA 95118

Phone: (408) 265-2600

1.4 Jurisdictional Areas to Be Filled

Areas meeting the regulatory definition of Waters of the United States under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act were delineated on all project sites in April and May 1995 (TRA 1995) and October 1997. These included tributary waters and wetlands. Project impacts did not involve placement of permanent fill; incidental fill may have occurred during sediment removal operations. Sediment excavation resulted in an increase in the area of tributary waters. The project temporarily decreased the extent of tidal brackish marsh by 8.9 acres and nontidal freshwater wetlands by 1.0 acres.

1.5 Types, Functions, and Values of Jurisdictional Areas to Be Impacted

The Project impacted nontidal freshwater wetlands and estuarine tidal brackish wetlands located in modified streams and artificial channels confined by levees. Because these wetlands occur in active stream channels, they are subject to periodic disturbance due to scouring flood flows. In-stream wetland species are adapted to temporary disturbances and are prone to recover rapidly. The area of Waters of the United States is not reduced from sediment excavation and aside from certain biological functions described below, functions that are typically associated with wetlands (e.g., Adamus et al. 1987, U.S. Department of Transportation 1990, TRA 1995) would not be adversely impacted (e.g., groundwater discharge/recharge, flood flow alteration, and recreation).

Temporal interruptions and alterations in some biological functions associated with in-stream wetlands are expected to result from sediment excavation. These include temporary reduction in habitat for wetland plants and wetland-related wildlife. These interruptions occur at a different time, scale, and frequency than would be expected in the absence of human intervention. However, in nontidal channels, sediment removal activities maintain the open, relatively flat-bottomed channel configuration conducive to wetland plant growth. This may ultimately result in the repeated reestablishment of in-stream wetlands that would otherwise eventually be precluded from the channel due to increasing sediment elevations that favor nonhydrophytic species or establishment woody vegetation which shades out wetlands.

1.5.1 Nontidal Freshwater Wetlands Functions and Values

Maintenance of Wetland Plant Community

Flood control channels are typically open (unshaded) and have relatively flat bottoms. An exception is the Stevens Creek work site, where the work area was partially bordered on one side by a narrow island that supports riparian forest, and the Calera Creek site where willow thickets have colonized a portion of the modified floodplain adjacent to the small low-flow channel.

Because of their location in active stream channels, in-stream freshwater wetlands are subject to frequent natural disturbances and variable hydrologic conditions on a seasonal and annual basis due to scouring flood flows, movement of sediment in the channel bed, variable timing, magnitude and duration or flows, and wide variation in the amount and timing of annual rainfall. As seasonal and annual conditions vary, wetland vegetation expands and contracts, disappears from some areas and colonizes others, and varies in terms of vegetation density and species composition.

In-stream freshwater wetlands vegetation of the Project consisted primarily of herbaceous hydrophytes. Many of the native and nonnative species that predominated are common, widely distributed cosmopolitan species, that occur in wetlands throughout the region or the country. Several of these species are disturbance dependent colonizers (some considered to be "weedy") reflective of the dynamic and disturbed nature of their habitat. Individual work sites were dominated both by native and nonnative species. Dominant species of the sites included cocklebur (*Xanthium strumarium*), bentgrass (*Agrostis stolonifera*), poison hemlock (*Conium maculatum*), hard-stem bulrush (*Scirpus acutus* var. *occidentalis*), broad-leaved cattail (*Typha latifolia*), willow-leaved dock (*Rumex salicifolius*), umbrella sedge (*Cyperus eragrostis*), horsetail (*Equisetum* sp.), loosestrife (*Lythrum hyssopifolium*) Italian ryegrass (*Lolium multiflorum*), and Bermuda grass (*Cynodon dactylon*). More detailed descriptions of the vegetation associated with each work site is contained in the 1997 permit application (TRA 1995).

Maintenance of Wildlife Habitat

Vertebrate species expected to be associated with in-stream freshwater wetlands include common species of birds, mammals, amphibians, and reptiles. Included among these are such birds as black phoebe (*Sayornis nigricans*), song sparrow (*Melospiza melodia*), marsh wren (*Cistothorus palustris*), common yellowthroat (*Geothlupis trichas*), mallard (*Anas platyrhynchos*), gadwall (*Anas strepera*), American coot (*Fulica americana*), great egret (*Ardea alba*), great blue heron (*Ardea herodias*), snowy egret (*Egretta thula*), and ring-billed gull (*Larus delawarensis*). Mammals expected to use the sites include raccoon (*Procyon lotor*), western harvest mouse (*Reithrodontomys megalotis*), Norway rat (*Rattus norvegicus*), opossum (*Didelphis virginiana*), and deer mouse (*Peromyscus* sp.); amphibians and reptiles include bullfrog (*Rana catesbeiana*), Pacific tree frog (*Hyla regilla*), western toad (*Bufo boreas*), and western aquatic garter snakes (*Thamnophis couchi*).

Nontidal channels provide habitat for a variety of fish and invertebrate species, that may also be associated with in-stream wetlands, although due to channel modification and the lack of riparian overstory, the Project sites most likely support a limited abundance and number of species. Fishes that have been identified on or near Project work sites include native species: California roach (*Hesperoleucus symmetricus*) and threespine stickleback (*Gasterosteus aculeatus*); and nonnative species: carp (*Cyprinus carpio*), goldfish (*Carassius auratus*), golden shiner (*Notemigonus crysoleucus*), rainwater killifish (*Lucania parva*), and mosquitofish (*Gambusia affinis*) (TRA 1996). Invertebrates observed on the Project sites include mayflies (Order *Ephemeroptera,* Family *Baetidae*), flies (including aquatic flies, Order *Diptera*, Family *Chironomidae*), caddisflies (Order *Tricoptera,* Family *Hydropsychidae*), adult dragonflies (Order *Odonata*), and damselflies.

Potential habitat for several special-status species including western pond turtle (*Clemmys marmorata*), red-legged frog (*Rana aurora draytoni*), burrowing owl (*Athene cunicularia*), and steelhead (*Onchorhynchus mykiss*) were identified on several work sites. The Project had no significant effect on these species.

1.5.2 Tidal Wetlands Functions and Values

Flood Attenuation

The Project area is located within a region that was historically a broad floodplain containing low gradient drainage networks of channels and sloughs. The floodplain has been highly modified so that water is now conveyed to the San Francisco Bay through confined levee systems. The channels within the Project area either modified natural tidal channels or are constructed from upland environments to improve flood flow conveyance.

Sediment Retention

Large amounts of suspended clay and silt particles are transported to the South Bay by tidal currents (Krone 1972). The sediment deposited in the tidal reaches is largely supplied by the Bay tides and to a lesser extent the upper watersheds of the local streams. As sediments accumulate, wetland vegetation becomes established, which promotes the accumulation of additional sediment. The sediments may be periodically scoured during flood flows and are removed during channel maintenance.

Maintenance of Plant Community

The in-stream wetland communities range in width from approximately 10 to 100 feet on each side of the low-flow channel. They are homogenous, linear, and lack the complex microtopographic features typical of the historic slough systems in the region. The plant species that occur in this region are adapted to a range of salinities and flooding depth and duration, widely distributed and resilient to perturbations. The wetland vegetation typically occurs in homogenous bands within clearly-defined zones on sediment benches. Native plant species are dominant at the project site and include California bulrush (*Scirpus californicus*), alkali bulrush (*Scirpus robustus*), broad-leaved cattail, and narrow-leaved cattail (*T. angustifolia*). Nonnative species included cocklebur, broad leaf peppergrass (*Lepidium latifolium*), and Italian ryegrass. No locally unique or special plant status species were found or would be expected to occur within the project sites.

Maintenance of Wildlife Community

The in-stream jurisdictional habitats includes open water and brackish marsh. The marshes support a resident wildlife community of limited diversity and a larger migratory community. The resident bird species include a variety of relatively common species. Examples of resident avian species typically associated with the channel habitats in the impacted area include mallard, gadwall, pied-billed grebe (*Podilymbus podiceps*), and American coot (*Fulica americana*). Typical avian species in marshes adjacent to the channels include great blue heron, snowy egret, black-crowned night heron (*Nycticorax nycticorax*), marsh wren, and red-winged blackbird (*Agelaius phoeniceus*). There are no resident species listed as threatened or endangered within the project areas. Common yellowthroats and song sparrows occur within the project area, but it is not clear if these are the sensitive San Francisco Bay subspecies or the more common inland species. Avian migrants and wintering species typically found in the tidal areas include Virginia rail (*Rallus limicola*) and sora (*Porzana carolina*), which inhabit the marsh, and Lincoln's sparrow (*Melospiza lincolnii*) and Golden-crowned sparrow (*Zonotrichia atricapilla*), which roost in the marsh and forage in the levee vegetation. There are no known occurrences of the federally-threatened California clapper rail (*Rallus longirostris obsoletus*) in the project area.

Resident mammals likely to occur in the project area include California ground squirrel (*Spermophilus beecheyi*), house mouse (*Mus musculus*), and the western harvest mouse (*Reithrodontomys megalotis*). The brackish marshes in the study area are not suitable habitat for the salt-marsh harvest mouse (*Reithrodontomys raviventris*; state and federally endangered) or the salt-marsh wandering shrew (species of special concern), which are generally found in pickleweed-dominated salt marshes.

Because the area is tidally influenced and brackish water is present, amphibians are not expected or known to occur in the project area. While reptiles are more tolerant of salinity, they are not known to occur in the project area.

Fishery resources known to occur within tidal reaches of the project area include chinook salmon (*Onchorhynchus tshawytscha*), striped bass (*Morone saxatilus*), carp (*Cyprinus carpio*), longfin smelt (*Spirinchus thaleichthys*), threespine stickleback, yellowfin goby (*Acanthogobius flavimanus*), northern anchovy (*Engraulis mordax*), and staghorn sculpin (*Leptocottus armatus*).

Benthic invertebrates expected to occur include oligochaetes, colembolans, larval dipterans, nematodes, foraminiferans, amphipods, and larval coleopterans. Crayfish (*Procabarus* sp.) and Asian clams (*Potamocorbula amurensis*) are found in the intertidal mudflats and numerous arachnids and insects inhabit the vegetation. The levees provide habitat for Chinese mitten crabs (*Eriocheir sinensis*). No endangered or threatened invertebrates species are known to occur in the project area.

Recreation

The service roads on the levees throughout the project area receive moderate recreational use by walkers, joggers and bicyclists and, in some areas, birders. Some of these service roads are open to the public.

PART II. FRESHWATER WETLANDS PRELIMINARY MITIGATION AND MONITORING PLAN

1.0 PROJECT MITIGATION GOALS AND OBJECTIVES

1.1 Types of Habitat to be Created

The goal of the mitigation project is to create off-stream freshwater seasonal or perennial wetlands adjacent to a stream corridor. Wetland basins will be excavated in an upland field near the south bank of Guadalupe Creek and water will be supplied from the Almaden Valley Pipeline (Figures 2 and 3). Water may also be diverted to the site from Guadalupe Creek from upstream of Masson Dam. The mitigation area will provide wetland acreage in excess of that required to cover impacts associated with the Project; the additional wetlands acreage will provide mitigation credits for future impacts related to the Program or other District projects.

Because a primary purpose of in-stream maintenance is to restore design flood control capacity by periodically removing accumulated sediment within channels, compensatory wetlands mitigation for in-stream maintenance projects cannot be located at in-stream locations subject to these disturbances. Placement of mitigation wetlands within channels might further reduce flood capacity and these wetlands would be subject to the same routine channel maintenance as impacted wetlands.

1.2 Functions and Values of Habitats to be Created

The Los Capitancillos mitigation project will provide habitat for common wetland plants and wetland-related vertebrate and invertebrate species of the Santa Clara Valley region. In-stream wetlands support relatively common, widespread native and nonnative plant and animal species and are subject to frequent natural and man-made disturbances that affect plant community features such as species composition, species dominance, and vegetation density. The wetlands mitigation basins will be subject to less frequent disturbance than in-stream wetlands and are consequently expected to provide habitat best suited to less disturbance-dependent species.

The particular suite of plant species targeted for planting and the types of plants expected to colonize the site will be determined during the detailed design phase and will be dependent on hydrological analyses of the site. It is, however, expected that grasslike perennial emergents, such as cattails (*Typha* spp.), tules (*Scirpus* spp.), rushes (*Juncus* spp.), and sedges (*Cyperus* and *Carex* spp.) will be important components of the plant association, and plantings will consist entirely of native, locally-occurring species. The design is expected to include a matrix of vegetated shallows with open water to increase the diversity of habitat features for a variety of wetland-related wildlife species.

The site, like the nearby Los Capitancillos Percolation Ponds, is underlain by alluvial deposits of cobbles and gravels (The Habitat Restoration Group [HRG] 1990) and is expected to provide similar groundwater recharge functions.

1.3 Time Lapse

The vegetation features of the site will not need to be fully developed in order for the site to provide wildlife habitat. The nature of the habitat will change as the vegetation establishes and expands. The time lapse for complete development of the vegetational features of the site is expected to be 10 years.

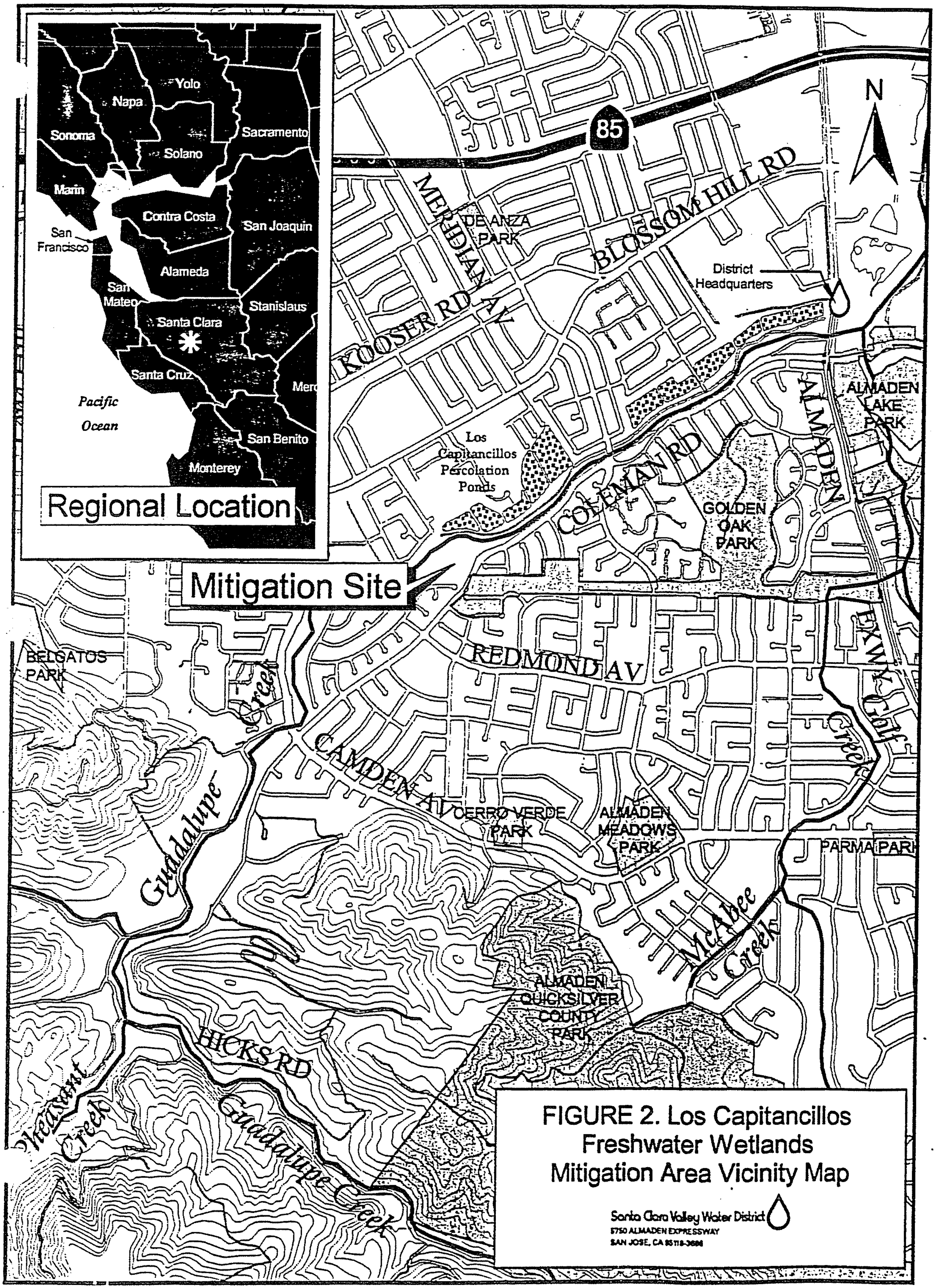

FIGURE 2. Los Capitancillos Freshwater Wetlands Mitigation Area Vicinity Map

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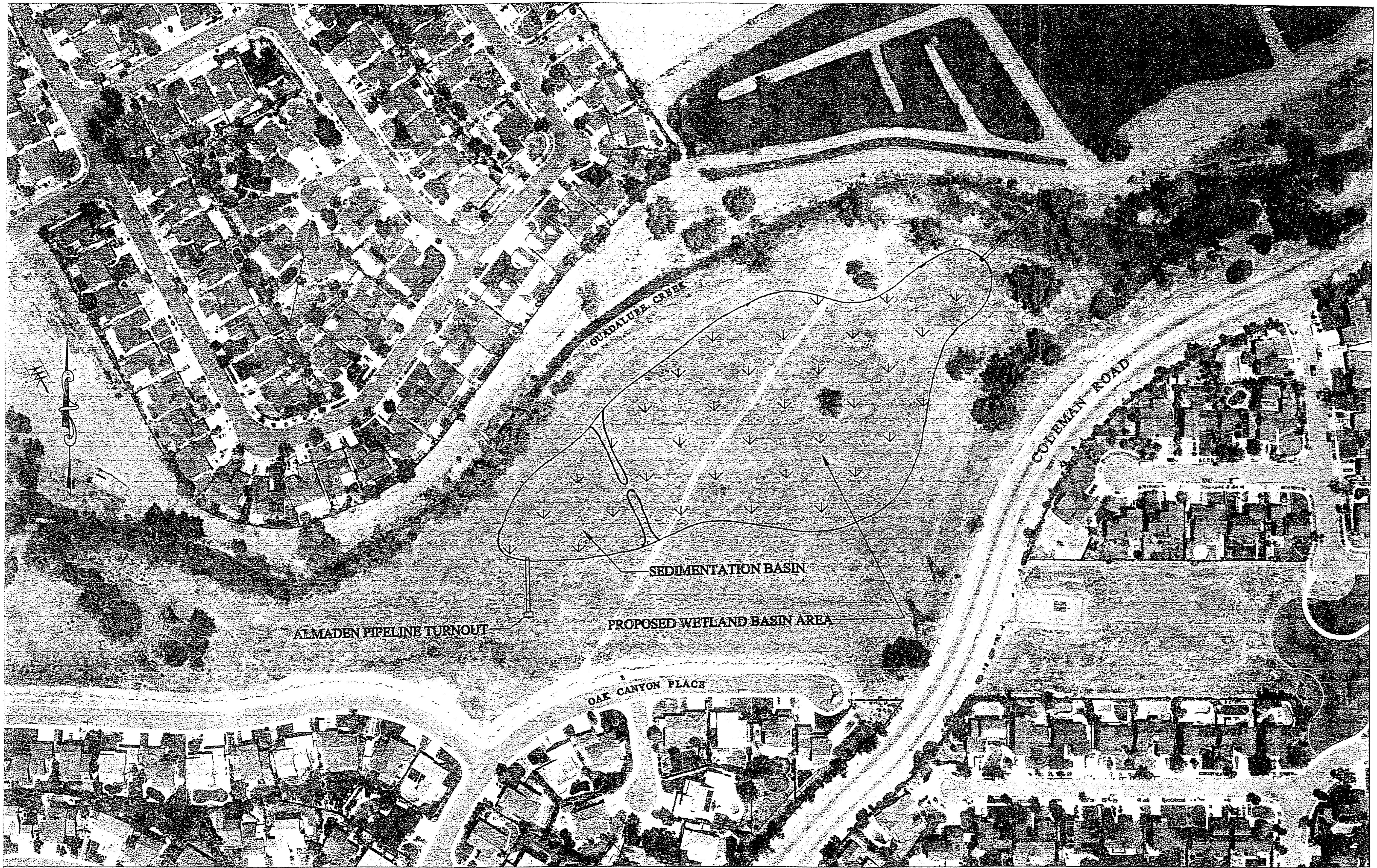

Santa Clara Valley Water District

Date of Photography: 4-25-90

Figure 2. Los Capitancillos Freshwater Wetlands Mitigation Area Schematic

Scale: 1"=145'

Date: 4/1/98

2.0 FINAL SUCCESS CRITERIA

2.1 Target Functions and Values

The specific target functions and values will be determined in the design phase of the mitigation project. Vegetation and hydrology will be the primary indicators of site success. Vegetation of the site will be dominated by hydrophytic species. Examples of the types of information that will be used to judge the project's progression towards its long-term goals include: vegetation distribution, extent, percent cover, species composition and species dominance; and timing, depth, and duration of ponding and/or soil saturation. Attributes such as these will serve as indicators for provision of general wetland-related habitat functions of the site.

2.2 Target Hydrologic Regime

The specific hydrologic regime will be determined upon completion of hydrologic analyses and selection of the final design. This analysis will include an investigation into the alternative options of seasonal filling and dry down of basins to reflect the natural seasonal local rainfall pattern or filling basins on a year-round basis with occasional dry downs as required for management purposes such as control of exotic wildlife species.

The basins will be supplied with water from the Almaden Valley Pipeline. Water may flow from the basins, at the downstream end, into Guadalupe Creek, or into the Los Capitancillos Percolation Ponds via a siphon. The hydrologic regime and water management design will take into account such features as the requirements of wetland vegetation regarding depth, duration, and timing of inundation and dry down; control of undesirable nonnative wildlife (such as bullfrogs), weedy wetlands plants (such as giant reed), algae, and mosquitos; sedimentation basin size and design; and potential effects of outflows on Guadalupe Creek.

2.3 Target Jurisdictional Acreage to be Created

Preliminary design plans indicate that approximately 5 acres of jurisdictional acreage can be created on the Los Capitancillos site, including an approximately 1-acre sedimentation basin. A portion of this acreage will be allocated to cover impacts to 0.6 acres of freshwater wetlands resulting from the 1997 Project. The acreage of mitigation required to compensate for 0.6 acres of impacts has not yet been determined. The remainder of the created wetlands acreage will be used as mitigation for impacts from the Program or other District projects.

3.0 PROPOSED MITIGATION SITE

3.1 Location and Size of Mitigation Area

The proposed mitigation area is located just south of Guadalupe Creek, adjacent to Oak Canyon Place and Coleman Drive, several hundred feet downstream of Camden Avenue in San Jose, Santa Clara County, California (Figures 2 and 3). The mitigation area is located within an irregularly shaped, undeveloped 32-acre parcel (Parcel). The Parcel includes the creek and a continuous band of undeveloped land on the creek's south bank, from just downstream of the mitigation area, upstream to Camden Avenue. The mitigation area occupies a broad field in the otherwise narrow creek-side Parcel. The site was selected because of its size, proximity to the stream, water availability, existing biological conditions, current land use, and District ownership.

3.2 Ownership Status

The entire Parcel in which the mitigation area is situated is owned by the District. PG&E has an easement for electrical transmission towers on a portion of the Parcel on which water supply structures will be located and several other easements cross the Parcel outside the mitigation area. The District's Almaden Valley Pipeline is located within the alignment of the PG&E easement.

3.3 Existing Functions and Values of the Mitigation Area

The mitigation area was formerly agricultural land and is now a ruderal field. The relatively flat site slopes gently down toward the east. The raised perimeter forms a berm under the high tension lines and near the adjacent roadways.

The site's ruderal vegetation includes wild oats (*Avena fatua*), ripgut brome (*Bromus diandrus*), wild radish (*Raphanus sativus*), and star thistle (*Centaurea solstitialis*). Several large valley oak (*Quercus lobata*), western sycamore (*Platanus racemosa*) and California black walnut (*Juglans californica var. hindsii*) trees, and smaller blue elderberry (*Sambucus mexicana*) are located on the site periphery near Coleman Road. One tree, a California black walnut, stands out from the perimeter and is located within the area to be encompassed by the mitigation basins.

Canopy cover in the riparian corridor immediately adjacent to the mitigation area is very sparse. The predominant tree is western sycamore, but most of the area is vegetated with herbaceous, ruderal species and occasional clusters of poison oak (*Toxicodendron diversilobum*) and other shrubs. Except for the narrow strip that would be occupied by the basin's water outlet structure and creek water inlet structure (if incorporated into the project), the mitigation area will be set back from the creek and will not encroach upon the riparian corridor.

The proposed mitigation site supports a mixed assemblage of common wildlife species. Birds are probably the most common inhabitants of the site. Because the site is a ruderal field, most bird use is limited to granivorous species such as mourning dove (*Zenaida macroura*), rock dove (*Columba livia*), California towhee (*Pipilo crissalis*), white-crowned sparrow (*Zonotrichia leucophrys*), house finch (*Carpodacus mexicanus*), and starlings (*Sturnus vulgaris*).

The site may also be used by red-tailed hawks (*Buteo jamaicensis*) hunting small mammals and rodents. Other soaring birds, such as turkey vultures (*Cathartes aura*), probably use the convection currents rising from the site to gain altitude.

Mammal use of the site is probably limited to transient species and a few colonizing species. Mule deer (*Odocoileus hemionus*), black-tailed jackrabbit (*Lepus californicus*), and Audubon's cottontail (*Sylvilagus audubonii*) are all expected to forage at the site, but retreat into the adjacent riparian woodland for cover. Deer mice (*Peromyscus* sp.), pocket mice (*Perognathus* sp.), Botta's pocket gophers (*Thomomys bottae*), ornate shrew (*Sorex ornatus*), and other rodents probably invade the site every year from the adjacent riparian woodland. These small mammals provide food for larger predatory species such as raccoon (*Procyon lotor*), gray fox (*Urocyon cineareoargentues*), and red fox (*Vulpes fulva*). Several bat species probably use the site to forage. Insects flying above the site and a few on the ground may provide food for species such as fringed and California myotis (*Myotis velifer* and *M. californicus*), big brown bat (*Eptesicus fuscus*), and pallid bats (*Antrozous pallidus*).

The site provides poor quality habitat for reptiles and amphibians. Several species probably use the site to a limited extent. Western toads and tree frogs may use the site periodically but they are not expected to breed on site. Western fence lizards (*Sceloperous occidentalis*) and alligator lizards (*Gerrhonotus* spp) probably roam across the site, but because of discing activities, they do not form stable populations. Gopher snakes (*Pituophis catenifer*), like the lizards, probably make use of the site on a limited basis but are limited by the current discing activities.

The perimeter of the field, adjacent to the mitigation area, has potential to serve as upland habitat for western pond turtles. The soil characteristics and partial exposures along the field edges, coupled with proximity to the creek are consistent with nesting areas used by this species. The creek/field border has some cover that could serve as upland overwintering sites. Although known to inhabit the watershed, the use of this area by western pond turtles is unknown.

3.4 Present and Proposed Uses of the Mitigation Area

The site is currently open space with no other formally proposed use. PG&E towers and power lines and the Almaden Valley Pipeline are located to the south and west of the mitigation area, within the Parcel. The mitigation project will encroach into these areas only to tap into the pipeline to supply water to the basins. A storm drain easement is also located to the west of the mitigation area. A proposed trail along Guadalupe Creek may traverse the periphery of the mitigation area in the future. Planning for this trail may be incorporated into the mitigation project in order to maximize recreational benefits while minimizing human intrusion into the mitigation area. Local residents currently use the area for passive recreational activities.

3.5 Section 404 Jurisdictional Areas

The mitigation area is an upland field that does not support jurisdictional areas. The water outlet from the mitigation area will likely be located outside the Corps' jurisdiction, above the ordinary high water level of Guadalupe Creek. The presence of jurisdictional areas within the project site will be determined after detailed plans have been developed.

3.6 Present and Proposed Uses of All Adjacent Areas

The mitigation area is located within a developed residential region of San Jose and is bordered on the south and east by roads, housing subdivisions, and a narrow park through which PG&E transmission towers and the Almaden Valley Pipeline pass. Masson Dam, which diverts creek water into the District's Los Capitancillos Percolation Ponds, is located just upstream on Guadalupe Creek and the percolation ponds are located to the northeast on the opposite side of the creek. Portions of the creek bank just to the north of the mitigation area are proposed for use as mitigation for riparian and shaded riverine aquatic habitat for the Downtown Guadalupe River Flood Control Project (T. Neudorf, Pers. Comm.).

3.7 Zoning and Jurisdiction

The property is zoned PD as part of a planned development that was constructed in the 1970s. The currently undeveloped Parcel was designated for sale to the District, which subsequently purchased it. Current zoning is consistent with maintaining the site as open space.

4.0 IMPLEMENTATION PLAN

4.1 Rationale for Expecting Success

In addition to review by District biological staff, the proposal for creating this type of wetland (in an upland location adjacent to a creek) has been reviewed by experts in the field of wetlands restoration and creation, including a local consulting hydrology firm retained by the District to conduct a constraints and opportunities analysis on a similar site (Phil Williams and Associates, Ltd. 1997). All have concurred that wetland creation on this type of site is feasible and can reasonably be expected to be successful. General features of the proposed mitigation area's hydrology and water management are similar to those of the District's off-stream percolation ponds, which the District has considerable experience in managing successfully. The District will build upon this knowledge, with modifications incorporated to obtain the objectives of wetlands creation and management.

The District has a long-term interest in the success of the mitigation program and a dedicated staff of biologists who will be responsible for overseeing Plan implementation. A consulting hydrology firm with wetland restoration experience, and other experts, as necessary, will be retained to assist in Los Capitancillos mitigation area site assessment, project design, and implementation.

4.2 Responsible Parties

The District will be responsible for the implementation and success of the mitigation area. The contact at the District will be Ms. Gale Rankin, Botanist, Santa Clara Valley Water District, 5750 Almaden Expressway, San Jose, CA 95118-3686, (408) 265-2600, extension 2729.

4.3 Site Preparation, Planting Plan, and Schedule

Site preparation plans will be developed as part of the planning design and after the appropriate hydrologic and other technical analyses are completed. Sedimentation and wetland basins will be excavated in the existing upland field. Wetland or upland islands may be incorporated into the basins. A turnout with an adjustable pressure reduction valve will be installed on the Almaden Valley Pipeline (Figure 3). From this turnout, water will be supplied to the sedimentation basin. As with District percolation facilities, this basin will trap the majority of the sediment entering the site. The option of also routing water to the site from Guadalupe Creek, just upstream of Masson Dam, will also be investigated. Water will exit the mitigation area either into Guadalupe Creek or the Los Capitancillos Percolation Ponds across the creek (via a siphon) near the downstream end of the mitigation area. Water control structures at the downstream end of the wetlands basin or basins will allow for adjustments in water level. Water inlets and outlets may include fish screens, if necessary.

The design will include features such as interpretive signs, vegetation screens, and fences to discourage intrusion by people and pets into the mitigation area. A public outreach program will be instituted in order to obtain public input and facilitate integration of the project into the surrounding neighborhood. A proposed trail along Guadalupe Creek may traverse the periphery of the mitigation area in the future. Planning for this trail may be incorporated into the mitigation project in order to maximize passive recreational benefits, including wildlife viewing, while minimizing intrusion.

The planning design will identify phasing associated with the construction, equipment to be used, location and type of hydraulic control structures, basin number, shape, size and configuration, hydrologic regime, description of anticipated maintenance, and other design features. Planting plans for establishment of locally-collected plugs and seeds will also be provided. The planning design will include plan and cross-section views of significant features.

Expected project milestones are:

- Final Planning Design, May 1999
- Final Approval of Engineer's Report, December 1999
- 50 Percent Construction Plans, September 2000
- Final Plans and Specifications, February 2001
- Construction, June 2001

4.4 As-Built Conditions

As-built drawings will be submitted to the Corps after construction is completed.

5.0 MAINTENANCE DURING THE MONITORING PERIOD

Specific maintenance activities will be identified in the planning design. It is anticipated that water supply and control structures will require ongoing maintenance, and that periodic adjustments of water flow will also be needed. Other activities such as weed control, plant replacement, control of nonnative fish and amphibians, and trash removal will also be identified in the planning design. The project will include the development of a maintenance and water management manual to guide both short- and long-term site management.

Long-term postmonitoring maintenance will include periodic sediment removal from the sedimentation basin, which will collect the majority of the sediment entering the site. Because wetlands naturally increase in elevation due to accrual of both inorganic and organic materials, sediment removal may be required, over the long-term, to prevent the wetlands from converting to uplands. Excavation to restore wetland hydrology will be conducted if the site's vegetation transitions to an upland community, dominated by nonhydrophytic species (either upland or facultative upland plants). Management guidelines will be developed to reduce the effects of excavation to the maximum extent possible.

6.0 MONITORING PROGRAM

6.1 Performance Criteria and Monitoring Methods

Specific performance standards and monitoring methods will be detailed in the planning design. Like the success criteria, the performance standards will focus on measures of wetland vegetation and hydrology of the site. Monitoring will track the establishment of wetland hydrology by measuring features such as timing, depth, duration, and extent of ponding and/or soil saturation. The development of wetland vegetation will be tracked by assessing features such as vegetation cover, composition, distribution, and extent.

The monitoring protocols will be selected for their ability to determine if the performance criteria are being met, and if not, to elucidate the possible causes. Monitoring will include photodocumentation of the site from established photopoints on site and may also include aerial photography. The schedule and frequency for monitoring different parameters may vary, depending on requirements for assessing performance of each parameter. In addition, the use of the site by wildlife will be noted during vegetation monitoring. This anecdotal information on the identity and approximate number of all species observed will be reported as additional information.

6.2 Reporting

Monitoring reports will be submitted annually for the first 5 years after construction is completed. The first monitoring report will be submitted by March 1 following the first year monitoring, and on March 1 of each monitoring year thereafter. Reports will be prepared and submitted by a qualified biologist under supervision of District biological staff. Analyses of quantitative monitoring data will be provided, as well as summaries of qualitative data and relevant anecdotal observations. Photographs and maps identifying monitoring areas will be included. Comments on any problems that may interfere with the success of the mitigation and proposed contingencies will also be outlined.

7.0 COMPLETION OF MITIGATION

7.1 Schedule and Notification of Completion

After 5 years, or when the success criteria are met, a final report will be prepared for the mitigation area substantiating rationale for achieving a successful mitigation and a summary evaluation of the mitigation project including evaluation of any corrective measures that have been taken.

8.0 CONTINGENCY MEASURES

8.1 Initiating Procedures

If performance standards are not met and there is reason to believe that they will not be met by the project, an analysis of the causes will be conducted and, if deemed necessary, corrective actions will be taken.

8.2 Funding Mechanism

The District will provide the funding for planning and implementing necessary contingency measures.

The District will be responsible for implementing contingency measures. The contact will be Ms. Gale Rankin, Botanist, Santa Clara Valley Water District, 5750 Almaden Expressway, San Jose, CA 95118-3686, (408) 265-2600, extension 2729.

PART III. TIDAL WETLANDS MITIGATION AND MONITORING PLAN

1.0 GOALS OF MITIGATION

1.1 Types of Habitat to be Created

The tidal wetlands mitigation goal for the Project is to restore 10 acres of self-sustaining, full-tidal marsh habitat in a diked historic wetland within a 15-year period (Figure 4). The 10 acres is part of a 25-acre restoration project being done as mitigation for the Program and/or other District projects. The Plan will provide in-kind, off-site mitigation for tidal wetlands and will result in a net gain in wetland function and acreage (providing 10 acres of mitigation for 8.9 acres of impacts). In addition, the mitigation project will create a vegetated marsh plain with associated slough channels characteristic of tidal marshes. The Plan will mitigate for impacts to western snowy plover (*Charadrius alexandrinus nivosus*) habitat, which is not affected by the Project, but is located within the mitigation site.

The objectives of the Plan are to establish the basis from which a full suite of wetland functions and values can be restored. The objectives are to:

- Restore an unmanaged full tidal regime;
- Restore elevations suitable for the establishment of a tidal marsh community;
- Establish 10 acres of a tidal marsh community by natural colonization; and
- Create habitat for the western snowy plover.

1.2 Functions and Values of Habitat to be Restored

More than 50 percent of the historical extent of tidal wetlands in the South Bay have been converted to shallow ponds for salt production and filled for development (Josselyn 1983). The conversion to salt ponds has resulted in a regional loss of functions attributed to vegetated tidal wetlands while favoring those functions associated with open water habitats. Salt ponds provide important habitat for many resident and migratory waterfowl species and are credited with the increase in regional populations of several bird species (San Francisco Estuary Project 1991). While it is important to recognize the ecological value provided by salt pond environments, the restoration of the Bay ecosystem health will require a trade-off between present values and those historical values that can be restored. This mitigation project would increase the extent of tidal wetland in the South Bay by expanding the amount of wetland in Guadalupe Slough by 25 acres.

By achieving the objectives of the mitigation, the principle physical and biological elements of tidal wetlands will be restored. The site is expected to develop over time into a self-sustaining system supporting a full suite of functions expected to occur in a healthy tidal wetland (Adamus 1983, Marble 1990, San Francisco Estuary Project 1991, and Smith et al. 1995).

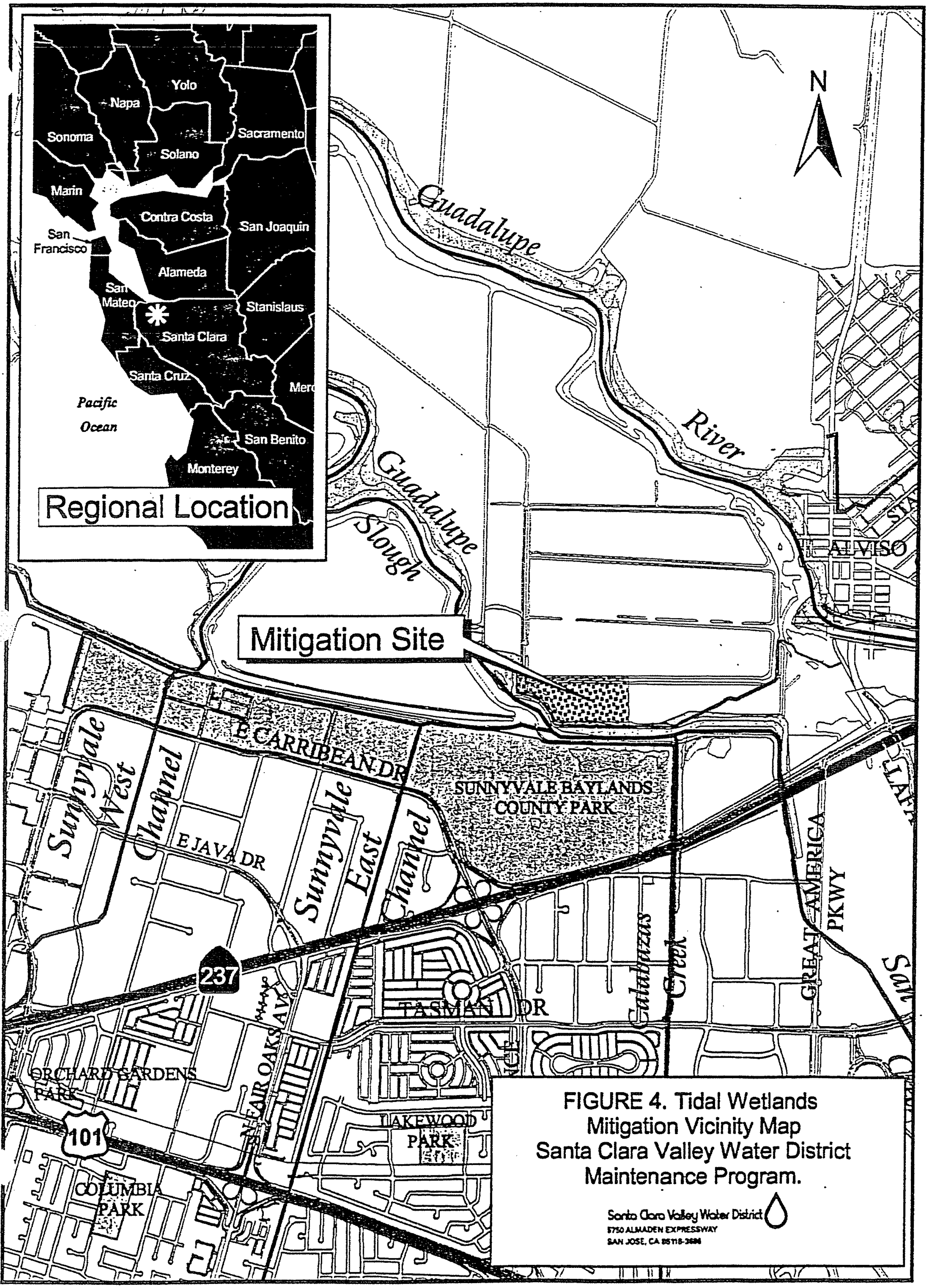

FIGURE 4. Tidal Wetlands Mitigation Vicinity Map Santa Clara Valley Water District Maintenance Program.

Santa Clara Valley Water District
5750 ALMADEN EXPRESSWAY
SAN JOSE, CA 95118-3686

DRAFT 5/13/98
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1.2.1 Sediment Retention

Sediment retention results when inorganic and organic particulate matter is deposited from the water column and removed from circulation. The sources of suspended sediment in the project area are the local tributary streams and the tidal flows in Guadalupe Slough. These waters are sediment-laden and deposit large volumes of sediment in the tidal channels. Tidal wetlands have a high value for sediment stabilization. The sediments deposited on the site will be important for raising the surface of the marsh plain to elevations suitable for the establishment of marsh vegetation and providing topographic complexity across the site.

1.2.2 Water Quality Improvement

Wetlands may improve the quality of water passing through them by temporarily or permanently retaining and altering pollutants. Numerous complex chemical and nutrient transformations occur because of the physical and biological processes that alter elements. Wetland vegetation cycles nutrients through uptake from the soil and water, accumulation of biomass, and production of litter. Litter supports the activity of microbial community that further converts nutrients to other organic or inorganic constituents. Because the restored site will be larger and more complex compared to the narrow strips of wetlands impacted by the Project, it is expected that the site will provide relatively higher value for this function than the impacted sites.

1.2.3 Organic Carbon Import/Export

Estuarine systems contain high amounts of dissolved and particulate organic carbon. Much of the organic matter comes from upstream and adjacent terrestrial environments and from the breakdown of biomass from insects, fungi, and microorganisms. The exchange and processing of organic carbon resulting from soil, detritus, and living biomass are important functions in tidal wetland systems that support the food chain and biogeochemical processes. The levee breach will provide a direct and unobstructed exchange pathway for import and export of dissolved and particulate carbon. The import and export of organic carbon is a direct function of the tidal prism.

1.2.4 Maintenance of Wetland Plant Community

The physical and chemical process occurring in tidal systems support productive and resilient plant communities. Tidal wetland plant communities are adapted to fluctuating hydrologic regime and salinities. The dominant plant species occurring in the vicinity of the mitigation site include California bulrush in the low marsh zone and alkali bulrush in the middle marsh zone. The mitigation site environment is expected to provide conditions suitable for the recruitment of new individuals and expansion of existing adjacent populations. While wetland plant communities have intrinsic value, they also support other tidal wetland functions, including nutrient transformation, sediment stabilization, and wildlife food chain support and contribute to regional biodiversity and natural heritage value.

1.2.5 Maintenance of Fish and Wildlife Community

Because of the greater habitat complexity that is expected to develop within the mitigation site (variable microtopography and low order sloughs), it is expected that the mitigation project will result in a net increase in regional habitat for species that depend on tidal wetlands. Tidal wetlands support a diverse community of vertebrate species by providing food, roosting, lophing, and refugia requirements. The tidal sloughs are expected to support benthic and aquatic invertebrates and fish, which support the food chain. The emergent vegetation will provide habitat for species that depend upon cover for feeding, roosting, and movement (dispersal and migration). It is expected that the mitigation site will be of relatively higher value to fish and wildlife than the impacted wetlands. Furthermore, the site will have a greater extent and connectivity to adjacent wetlands and contribute to the diversity of habitats in the region. This function supports regional biodiversity and natural heritage values.

During the evolution of the marsh, the site will provide transitional functions, which may include habitat for sensitive species. Many of these functions are transitional and will not occur in the mature marsh.

1.3 Time Period for Long-Term Goal

The mitigation goal should be achieved by year 15 as the site evolves from a permanently-flooded pond to tidally flooded mudflat to vegetated tidal wetland. The timeframe for achieving the long-term goal is based on the time required for the marsh plain to aggrade to approximately mean higher high water (MHHW).

2.0 FINAL SUCCESS CRITERIA

The final success criteria will be used to determine fulfillment of the mitigation responsibilities. Meeting the criteria indicates that the mitigation site is progressing as planned toward the goal.

2.1 Target Functions and Values

The target functions and values expected to occur at the site are those typically found in tidal wetlands as described in Section 1.0. The final success criteria are based on the hydrologic regime, marsh plain elevation, and wetland plant community that are expected to occur as the site approaches an equilibrium state. In addition, a final success criterion has been established to ensure the availability of habitat for the western snowy plover, which uses the existing mitigation site.

2.1.1 Sediment Retention

Sediment retention is expected to evolve through three stages including (1) sediment accretion, (2) erosion and deposition processes that form slough channels, and (3) approaching an equilibrium stage where erosion and sediment accretion are in balance. Sediment retention is expected to be rapid initially and decrease over time as the site approaches equilibrium. Fine suspended silts and clays will be carried by the tidal water onto the developing marsh plain and provide the initial substrate for invertebrate and plant colonization. Sediment retention is expected to continue as the developing marsh plain aggrades toward the MHHW level and after vegetation becomes established and traps suspended sediments from the water column. A tidal drainage network is expected to form as the marsh plain aggrades toward MHHW.

Success Criteria 1: Trend of sediment accumulation indicative of achieving elevation of approximately MHHW (approximately 4.6 feet National Geodetic Vertical Datum [NGVD]) by year 15.

2.1.2 *Maintenance of Wetland Plant Community*

A self-sustaining estuarine emergent marsh plant community should evolve over time after suitable elevation, hydrologic regime, and substrate are established. Based on the existing vegetation in the reference marshes nearby, it is expected that the restored marsh will be dominated by dense stands of California bulrush at low marsh elevations (approximately 2 to 3 feet NGVD) and alkali bulrush and cattail at middle marsh elevations (4 to 5 feet NGVD).

Success Criteria 2: Trend indicates that 10 acres of tidal marsh plant community will be established by year 15.

Success Criteria 3: Plant community species composition comparable to reference condition within 10 years.

2.1.3 *Maintenance of Fish and Wildlife*

The mitigation site will have immediate habitat value to those species that prefer an open water environment. It is expected that the site will initially be used by waterfowl for feeding and lophing. The habitat value will gradually shift as the site evolves from open water to a vegetated tidal marsh. The development of mudflats is expected to promote a more diverse community of vertebrates and provide forage habitat for shorebirds. As vegetation colonizes the site, the developing habitat structure will favor species, such as rails and small mammals, that use vegetation for refugia. Tidal sloughs are expected to provide habitat for fish and foraging areas for waterfowl, shorebirds, rails, and other waterbirds.

The mitigation site will be developed within habitat that is used by western snowy plover and is a mitigation site for them. This Plan proposes to compensate for impacts of the mitigation project to western snowy plover habitat by creating habitat on site. The most reliable determination of the presence of habitat is the use of a site by the target species. However, many regional factors may account for the presence or absence of a particular species at a site regardless of the habitat quality. Therefore, we will evaluate the success at establishing western snowy plover habitat by monitoring the use of the site by members of the shorebird guild, including western snowy plover, as an indicator of available habitat for western snowy plover. Monitoring would be done at a time when western snowy plovers would be expected at the site.

Success Criteria 4: Create a minimum of 1.5 acres of potential nesting habitat for the western snowy plover by year 1.

Success Criteria 5: Members of the shorebird guild use the site during 3 consecutive years in the last 5 years of the monitoring program (years 5 through 10).

2.2 Target Hydrologic Regime

The target hydrologic regime is full tidal action. Guadalupe Slough adjacent to the site will provide an ample supply of tidal flow to the site (Philip Williams & Associates, Ltd. 1997). During mean high tides (approximately 4.1 feet NGVD), the mitigation site is expected to be partially inundated. During mean higher high tides (approximately 4.6 feet NGVD), the mitigation site is expected to be fully inundated. The development of tidal slough channels will facilitate the complete inundation and drainage of the site.

Success Criteria 6: Tidal elevations comparable to reference tidal elevations for the last 3 years of the monitoring program.

2.3 Target Jurisdictional Acreage to be Created

The target tidal wetlands jurisdictional acreage to be created for the Project is 10 acres. The 10 acres is part of a larger restoration project for which 25 acres of jurisdictional area will be restored.

3.0 PROPOSED MITIGATION SITE

3.1 Location, Size, and General Description of Mitigation Area

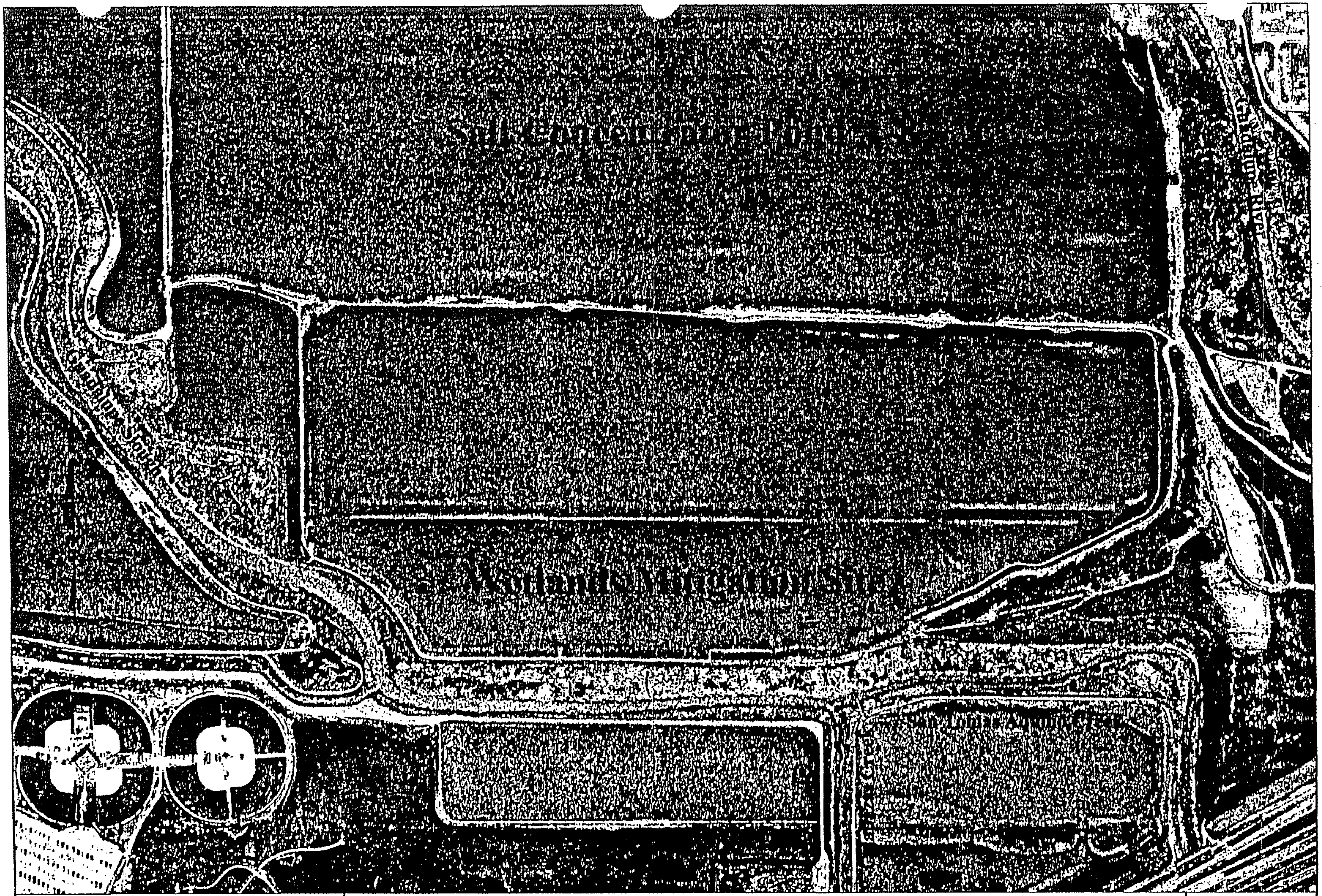
The proposed mitigation site is located near the west side of Alviso, to the north of Sunnyvale and between Alviso and Guadalupe Sloughs in South San Francisco Bay in the city of San Jose. The site is within the salt evaporator pond designated by Cargill Salt Company (Cargill) as pond A-8 (Figures 4 and 5). The site is located on the United States Geologic Survey Milpitas Quadrangle 7.5 Minute Topographic Map at latitude 37°25′ and longitude 121°59′. The entire pond is approximately 580 acres. The mitigation site is located in the southernmost parcel of the pond, which is partitioned from the northern pond area by a low berm. The parcel is approximately 60 acres, of which 25 acres will be restored in the short-term. The mitigation site was selected because of its size, proximity to tidal sloughs, current land use, and the high potential for successful restoration to its historic tidal wetland condition. An additional advantage to the selected site is that it could be easily integrated into a larger scale restoration project in the future.

Earthen levees constructed for salt production in the 1930s isolated the site from tidal and freshwater flows. The pond has been used for salt production since that time. The parcel that is proposed for mitigation was drained to make repairs in the early 1990s on the toe of the levee abutting the Highway 237 Landfill adjacent to the site. The parcel is currently not being used for production and functions as a seasonally-flooded impoundment. The impoundment receives direct precipitation and small amounts of local runoff. During rare flood events, as in 1998, flows from San Tomas Aquino Creek and Guadalupe River may overtop the levees. The ponded water evaporates during the summer months to expose bare mud substrate.

Subsidence has occurred in the area probably because of a combination of groundwater withdrawal and compaction or oxidation of the clay surface after the area was diked. The existing surface is at approximately -3.0 feet NGVD and is comprised of clay. The surface is level across the site. A remnant brine ditch is located at the base of the outboard levee and several ditches are located in the central portion of the site.

3.2 Ownership Status

The site is currently owned by Cargill Salt Division, Newark, California. The District and Cargill are working toward an agreement whereby the District will purchase a portion of salt pond A-8. The District expects to assume fee title by August 1998.



Santa Clara Valley Water District

Date of Photography: 3-2-98

Figure 5. Tidal Wetlands Mitigation Area - Aerial View

Scale: 1"=700'

Date: 6/8/98

3.3 Existing Functions and Values of the Mitigation Area

3.3.1 Flood Attenuation

Because the site is a diked facility, is small, and is located in the lower watershed, it provides no value for attenuating flood flows.

3.3.2 Sediment Retention

The site is isolated from tidal action and, therefore, does not function in sediment retention.

3.3.3 Water Chemistry/Chemical Transformations

When in operation, pond A-8 is a low salinity salt concentrator pond, with salinities ranging between 15 and 25 parts per thousand (ppt). Under existing conditions, the surface is an exposed salt pan for much of the year. Evaporation of the hypersaline soil water results in a white surface crust of halite deposits over much of the area. Salinity of the water in the brine ditch adjacent to the outboard levee and the remnant slough channels has exceeded 200 ppt.

3.3.4 Organic Carbon Import/Export

This function does not occur at the site.

3.3.5 Maintenance of Wetland Plant Community

No vegetation is present in the pond. The hypersaline soils precludes the establishment of vegetation. An isolated fringe of depauperate pickleweed occurs along the perimeter of the levees and ruderal grasses occur on the levees.

3.3.6 Maintenance of Fish and Wildlife Community

The salt pond system provides feeding, roosting, and nesting habitats for many species of waterbirds and a smaller number of other animals. The aquatic faunal ecosystem provided by the ponds is an important food source for waterbirds (Lonzarich 1989), and the levees provide roosting and nesting habitat for some birds (e.g., western snowy plovers, American avocets [*Recurvirostra americana*], black-necked stilts [*Himantopas mexicanus*]). The salt pond system has increased the occurrence of several waterbird species, including historically uncommon species of shorebirds (San Francisco Estuary Project 1991). Nearly all species of waterbirds in the Bay use salt ponds. Some of these species limit their use to a specific activity such as roosting, while others, such as phalaropes (*Phalaropus* spp.) and Bonaparte's gull (*Larus philadelphia*), use the ponds almost exclusively as winter migrants. The mitigation project would decrease the habitat value of the site for water-dependent species.

Birds

A large number of shorebirds have been seen at the mitigation site or near the site in Lower Guadalupe River and can reasonably be assumed to use the site on occasion. These include American avocet, black-necked stilt, marbled godwit (*Limosa fedoa*), long-billed curlew (*Numenius americanus*), western sandpiper (*Calidris mauri*), sanderling (*Calidris alba*), killdeer (*Charadrius vociferus*), dunlin (*Calidris alpina*), greater yellowlegs (*Tringa melandoleuca*), and willet (*Catoptrophorus semipalmatus*). Waterfowl include mallard, American widgeon, northern pintail (*Anas acuta*), green-winged teal (*Anas crecca*), gadwall, northern shoveller, greater scaup (*Aythya marila*), and Canada geese (*Branta canadensis*). Waterbirds foraging at the site include great egret, great blue heron, snowy egret, American coot, Virginia rail, and sora. The double-crested cormorants (*Phalacrocorax auritus*) and American white pelicans (*Pelecanus erythrorhynchos*) roost near the site.

Predatory birds occurring at or in the vicinity of the site include northern harrier (*Circus cyaneus*), white-tailed kite (*Elanus caeruleus*), red-tailed hawk, American kestrel (*Falco sparvareus*), merlin (*Falco columbarius*), osprey (*Pandion haliaetus*), barn owl (*Tyto alba*), and short-eared owl (*Asio flammeus*). Terrestrial birds that may use the site for foraging include black phoebe, violet-green swallow (*Tachycineta thalassina*), barn swallow (*Hirundo rustica*), cliff swallow (*Hirundo pyrrhonota*), American crow (*Corvus brachyrynchos*), Loggerhead shrike (*Lanius ludovicianus*), red-winged blackbirds (*Agelaius phoeniceus*), ruby-crowned kinglet (*Regulus calendula*), white-crowned sparrow, and golden-crowned sparrow.

Several federally-threatened and endangered bird species are known to occur or have occurred in or adjacent to the salt pond. The southernmost interior levee is a mitigation site intended to provide nesting habitat for the western snowy plover. During surveys for colonial waterbirds, western snowy plovers were observed using pond A-8 between 1994 to 1996, but none were observed in 1997 (San Francisco Bay Bird Observatory 1998). Clapper rails (*Rallus longirostris*) have been reported from the downstream sections of Guadalupe Slough, but were not found during surveys conducted on Sunnyvale East Channel in 1988, Guadalupe Slough and Alviso Slough during the winters of 1996 to 1997. A second rail species, the black rail (*Laterallus jamaicensis*) is also known to occur in the area but little is known about its abundance or distribution. Other sensitive bird species known to occur in the vicinity include California least tern (*Sterna antillarum browni*) and peregrin falcons (*Falco peregrinus*), which use the Pacific Gas & Electric Company (PG&E) electrical transmission towers as roost sites and observation platforms from which they hunt. Salt-marsh common yellowthroat (*Geothlypis trichas sinuosa*), Alameda song sparrow (*Melospiza melodius pusillula*), and Tricolored blackbirds (*Agelaius tricolor*) are known to occur in the brackish marsh adjacent to the mitigation site. The adjacent levees may provide habitat for the burrowing owl (*Athene cunicularia*), a state special status species, but were not found during 1997 surveys along San Tomas Aquino Creek downstream of Highway 237. These bird species may benefit from the project.

Mammals

Mammals expected at the site include western harvest mouse, Norway rat, California vole (*Microtus californicus*), house mouse (*Mus musculus*), jackrabbit (*Lepis californicus*), deer mice, and Yuma myotus (*Myotus yumanensis*). Mammal predators known to occur at or near the site include red fox, striped skunk (*Mephitis mephitis*), long-tail weasel (*Mustella frenata*), raccoon, and opossum (*Didelphis virginiana*). Salt-marsh harvest mice are not expected to occur at the site because habitat is lacking.

Amphibians and Reptiles

Because of the salty soils and saltwater present on site, no reptiles or amphibians are expected within the pond system. Similarly, the salt content of the channels surrounding the salt pond (San Tomas Aquino Creek, Calabazas Creek, and Guadalupe Slough) is too high to provide habitat for amphibians. Reptile species such as Western fence lizard (*Sceloporus occidentalis*), Southern alligator lizard (*Gerrhonotus multicarinatus*), Western aquatic garter snake, and Gopher snake (*Pituophis melanoleucus*) may be found on adjacent levees. The only sensitive reptile in the vicinity is the southwestern pond turtle (*Clemmys marmorata pallida*) and this species may be found in the channels surrounding the salt pond but not in the salt pond. Monitoring for southwestern pond turtles on San Tomas Aquino Creek prior to sediment removal activities in 1997 produced no evidence of these turtles.

Fish

No fish species are found in the mitigation site.

Invertebrates

The remnant brine ponds within the site provide habitat for brine shrimp (*Artemia salina*). The use of the site for foraging by migrant shorebirds indicates the presence of a benthic invertebrate community.

3.3.7 Recreation

There is no recreation at the site. Public access is restricted by a locked gate.

3.4 Historical, Present, and Proposed Uses of the Mitigation Area and Adjoining Areas

The mitigation site was historically part of an extensive tidal salt marsh within the Guadalupe Slough and Alviso Slough systems. A series of earthen berms were constructed to contain the Bay water for salt concentration. The site was used for harvesting salt before 1928. Pond A-8 is currently used as a salt concentrator pond.

The Highway 237 Landfill, which occupies the southeastern corner of the pond, began service in 1962. The landfill received primarily demolition debris and minor amounts of municipal trash. Concrete rubble, car tires, and other debris can be found in the pond near the landfill. Postclosure monitoring continues at the landfill and no leakage has been reported. No hazardous materials exist at the site (Kleinfelder, Inc. 1997). PG&E transmission towers occur in a east-west orientation within the marsh fringing the San Tomas Aquino Creek and Guadalupe Slough and a north-south orientation along the west side of pond A-8.

A Department of the Army permit (No. 19383S04) was granted to Cargill in 1992 to make levee improvements within pond A-8. As a special condition to the permit, Cargill was directed to modify the southernmost interior levee (the northern boundary of the mitigation site) to provide nesting habitat for the western snowy plover.

The site will serve as a mitigation wetland and have no other use once it is constructed. The District may restore the remainder of the parcel to tidal wetlands in the future. Plans for that project would be described under a separate permit application and mitigation plan. If the site is not used for wetlands mitigation, Cargill may resume salt concentration operations at the site.

3.5 Wetland Impacts Associated With the Mitigation Project

Impacts to wetlands associated with the mitigation project will result from incidental fill from breaching the levee along Guadalupe Slough. A band of wetland dominated by California bulrush occurs on the outboard side of the levee adjacent to the creek. The area of wetland impact is expected to be less than 0.5 acre. Placement of fill at the site for the construction of levees and to raise the surface elevation of the brine ditch is not expected to impact wetland habitat.

3.6 Zoning and Jurisdiction

The site is currently zoned agricultural and is designated as private open space in the City of San Jose General Plan.

4.0 DESIGN AND IMPLEMENTATION PLAN

4.1 Rationale for Expecting Success

The proposal for restoring this site to tidal marsh has been reviewed by District biological staff and by a local hydrological consulting firm having expertise in the restoration and creation of tidal wetlands (Philip Williams & Associates, Ltd. 1997). The conclusion of the constraints and opportunities analysis resulting from this review was that the restoration of a tidal wetland at this site is feasible and can reasonably be expected to be successful. Additional hydrologic analyses will be done to optimize the site design. There are at least seven reasons for expecting success at this site:

1. The site is historic tidal wetlands.
2. A full tidal regime can be restored to the site.
3. Ample sediment supply is available to restore the marsh plain elevation to the elevation of MHHW.
4. The adjacent area currently supports tidal brackish marsh.
5. The site will be connected hydrologically to adjacent marshes, which can provide the necessary propagules for vegetation establishment.
6. Emergent wetland vegetation establishes quickly when appropriate elevations and hydrologic regime are restored and propagules are available.
7. The hydrologic design does not require ongoing maintenance.

Several projects in the San Francisco Bay Area have successfully demonstrated the restoration of tidal wetlands from diked lands, including sites in San Mateo, Marin, and Alameda counties. Tidal wetlands have been restored at these sites by breaching levees and raising bottom elevations by allowing natural sedimentation or by placement of dredge materials. Finally, the District has a dedicated staff of senior biologists who will oversee the implementation of the Plan and will follow through with the monitoring program.

4.3 Site Preparation

Site preparation involves constructing or modifying 3 levees: The interior levee on the northwest portion of the site will be improved, a new interior levee oriented generally north-south will be constructed along the eastern side, and the existing levee along Guadalupe Slough will be breached. No planting will be done, because the marsh plain will be allowed to revegetate naturally and the levees will be maintained free of vegetation to provide western snowy plover nesting habitat. A plan view of the design and typical cross section are shown in Figures 6 and 7.

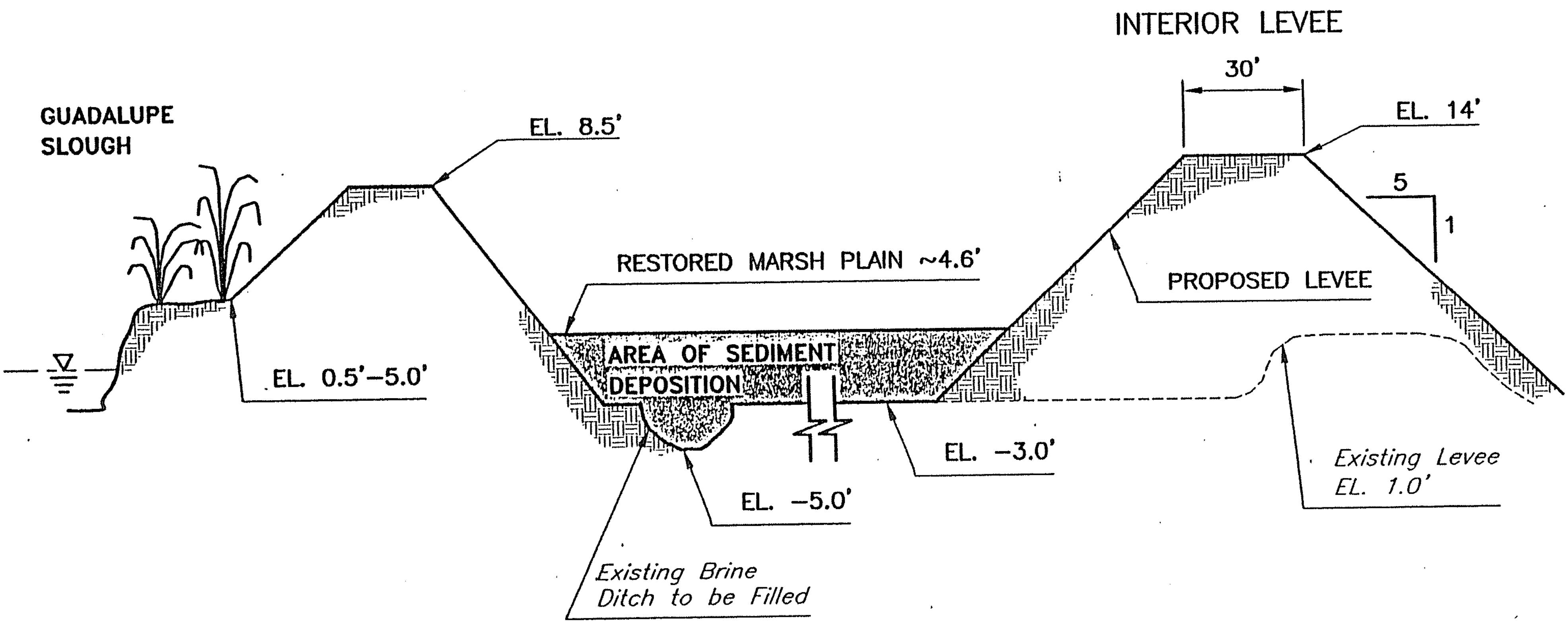
Because the southwest levee along Guadalupe Slough will be breached, the existing interior (northern) levee will need to be upgraded to provide flood protection to an adjacent salt pond and to form the northern border of the mitigation site (Figure 8). The upgraded levee design includes a crown width of approximately 30 feet, a final crown height of a minimum of 14 feet NGVD (including provision for subsidence and shrinkage), and minimum slopes of 5:1. A 12-inch aggregate rock base on the crown will provide a surface suitable for all-weather vehicular access across the levee. The levee will have a total length of approximately 2,000 feet. The levee will occupy approximately 9 acres of the site. A new interior levee will be constructed to form the eastern border of the site. The configuration will be identical to the upgraded levee described above, except that the length of the levee will be approximately 750 feet long and occupy approximately 3 acres.

The inboard slopes of the constructed levees will be surfaced with 2 to 4 inches of sand to provide nesting habitat for western snowy plovers. To optimize nesting habitat quality for plovers on the constructed levees, measures will be taken in the site preparation to minimize opportunity for vegetation establishment. These measures may include the use of gap-graded sand, weed cloth under the sand, and soil under the weed cloth collected at its source from below the seedbank layer. Gated 6-inch chain link fences that slope down to the water's edge will be installed at strategic locations to deter predators.

To prevent the existing brine ditch from capturing the tidal flows after the levee is breached, clean fill material may be placed in the brine ditch to the level of the existing pond surface elevation. This material may include soil from the breached levee or sediments excavated from the tidal channels. The material will be tested to ensure that it is consistent with the criteria for screening and testing dredge material quality (e.g., Wolfenden and Carlin 1992 or other appropriate source).

Full tidal action will be achieved by breaching the outboard levee adjacent to Guadalupe Slough. The dike breach will be oversized to ensure full tidal range at the most distant portions of the restored marsh. Cofferdams and a bypass channel may be installed to maintain a live flow inGuadalupe Slough while the outboard levee is breached.

The design parameters are subject to minor revisions based on the completion of geotechnical and hydrologic analyses and the possibility that this site may be incorporated into a larger restoration project. Because tidal sloughs and vegetation will be allowed to develop naturally, the final marsh configuration will not be specified in the design.



Santa Clara Valley Water District

FIGURE 7 — TIDAL WETLANDS MITIGATION
TYPICAL SECTION A—A

NOT TO SCALE

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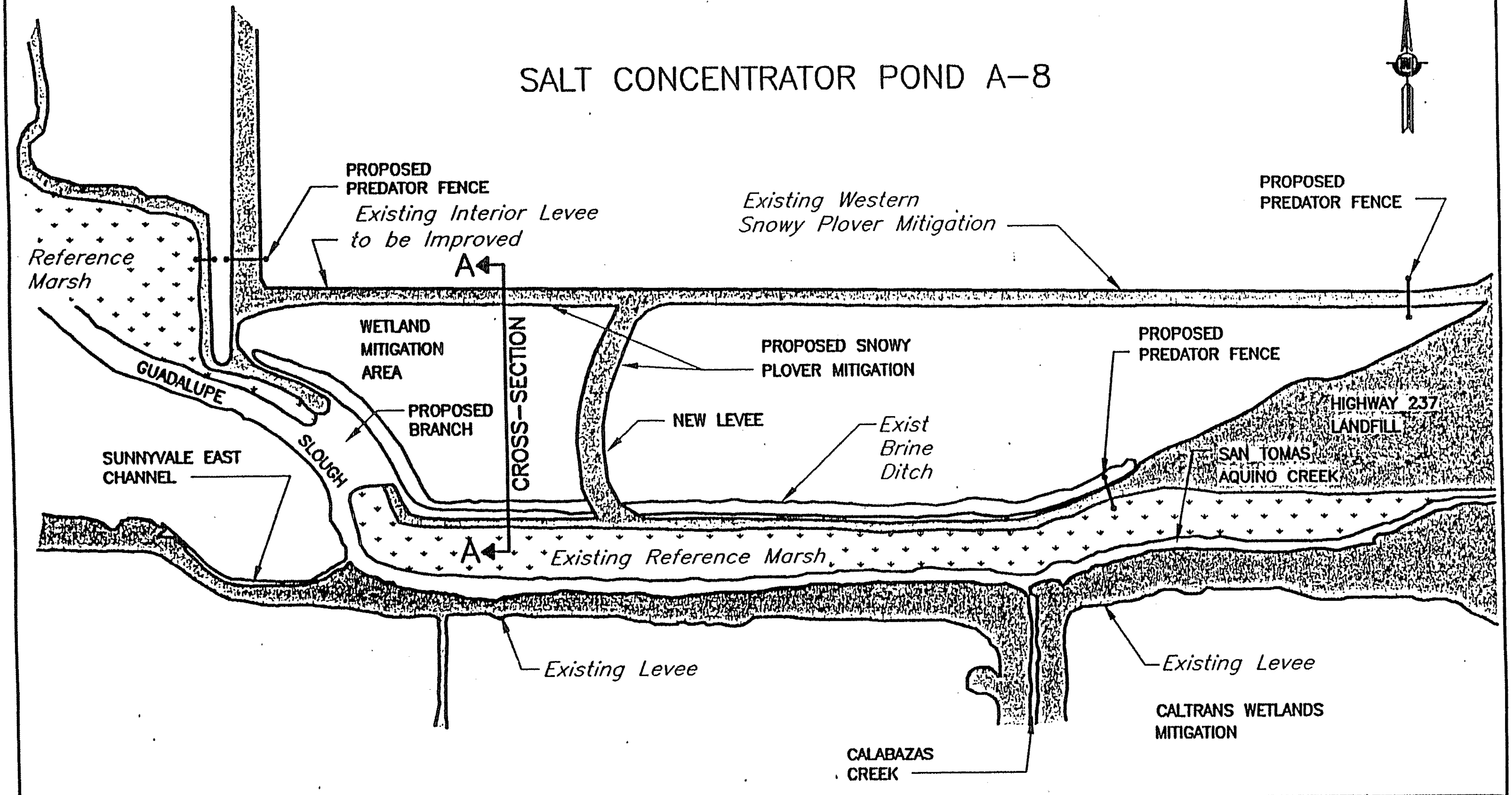

Santa Clara Valley Water District

FIGURE 6 — TIDAL WETLANDS MITIGATION PLAN VIEW

NOT TO SCALE

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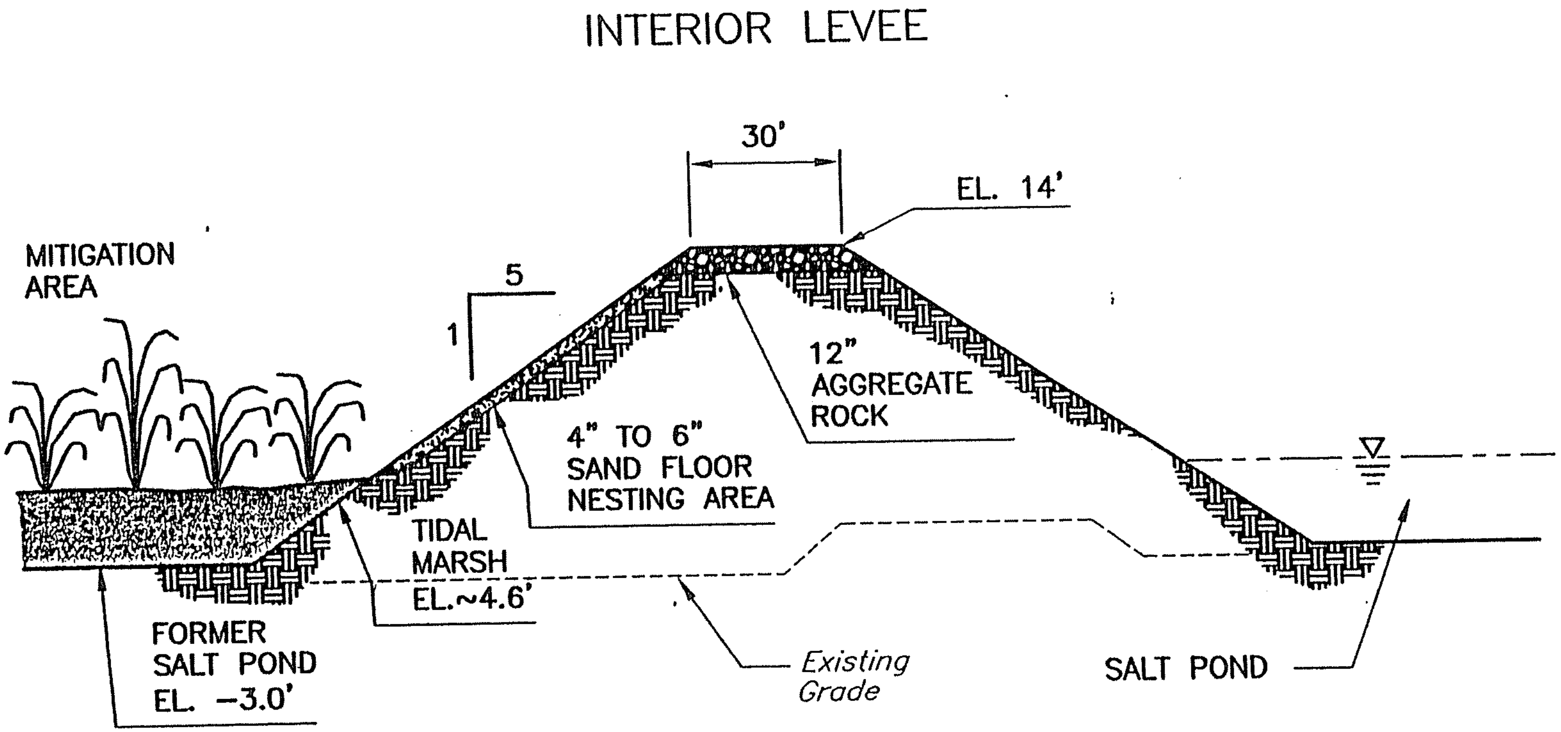

Santa Clara Valley Water District

FIGURE 8 — TIDAL WETLANDS MITIGATION
SECTION VIEW OF INTERIOR LEVEE

NOT TO SCALE

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4.4 Construction Monitoring

Monitoring during construction will be done to ensure that unnecessary biological impacts do not occur. Construction monitoring will be done by District environmental staff. The contact person will be Ms. Louisa Squires, Wetlands Specialist, Environmental Resources Management Unit, Santa Clara Valley Water District, 5750 Almaden Expressway, San Jose, CA 95118-3686, (408) 265-2600, extension 2745.

4.5 Planting Plan

Vegetation planting is not planned as part of the mitigation project. Vegetation is expected to colonize naturally.

4.6 Irrigation Plan

Irrigation is not necessary.

4.7 Schedule

Construction for the mitigation project is planned for the year 2000. The project schedule for implementing the mitigation program is presented in Table 3.

TABLE 3. Urgent Sediment Removal Project Tidal Mitigation Implementation Schedule

Activity	1998		1999				2000			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Acquire fee title for mitigation site		Aug								
Complete 50% plans and specs		▨	▨	▨	Sep					
Complete final plans and specs			▨	▨	▨	▨	Feb			
Advertise and award mitigation construction project							▨	May		
Begin construction								Jun		
Complete construction								▨	Sep	
Prepare as-built drawings										Oct
Mitigation construction notice of completion to Corps										Nov
Initiate monitoring program										Nov

4.8 As-Built Conditions

The District will submit plans and specifications to the Corps in February 2000. The "as-built" plans will be submitted to the Corps within 10 weeks of completing the construction. The as-built plans will document the actual postconstruction spot elevations, the cross-sectional configuration of the breach, and deviations from the final mitigation plan. An aerial photograph will be taken to document the postconstruction site conditions. The as-built plans will be superimposed on the aerial photograph. The as-built plans will show the location and direction for all photodocumentation stations.

4.9 Responsible Parties

The District will be responsible for the implementation and success of the compensatory mitigation site. The contact at the District will be Ms. Louisa Squires, Wetlands Specialist, Santa Clara Valley Water District, 5750 Almaden Expressway, San Jose, CA 95118-3686, (408) 265-2600, extension 2745.

5.0 MAINTENANCE AND MANAGEMENT DURING MONITORING PERIOD

It is expected that maintenance and management will be minimal. Routine maintenance may include minor levee repairs due to burrowing animals and erosion and eradication of vegetation on the levees to maintain nesting habitat for the western snowy plover. It is anticipated that an intensive effort may be required to prohibit the establishment of peppergrass as the marsh plain aggrades toward the target elevation. Management will include inspection of predator fences to ensure they are functioning properly. Maintenance and management activities will be reported in annual reports.

6.0 MONITORING PROGRAM

This section describes the performance standards that have been identified to assess the progress of the site toward meeting the success criteria and the monitoring protocols that provide the measures for evaluating performance standards and success criteria. In addition, the monitoring program will develop a data base to make informed decisions for remedial measures and appropriate adaptive management. The monitoring program will include comparative studies between the mitigation site and reference wetlands in the vicinity. Monitoring will be done for 10 years or until the success criteria have been achieved.

To reduce disturbance at the site, sampling protocols have been selected that are the least intrusive but still provide necessary information. Monitoring will be done by qualified biologists and by other experts as appropriate under the supervision of District biological staff.

The primary objectives of the monitoring plan are to:

1. Measure sedimentation rates.
2. Measure tidal regime over time.
3. Measure changes in the quality and extent of vegetation colonization.
4. Document the use of the site by members of the shorebird guild.

6.1 Performance Standards

Performance standards measure how well the objectives of the mitigation project are being met. Successfully restoring the site will depend primarily on restoration of full tidal regime, aggradation of the marsh plain to approximately the MHHW level, and the development of a marsh plant community. Table 4 outlines the relationship between the objectives of the mitigation project, the success criteria, performance standards, and the monitoring attributes.

An essential feature of the design is to restore full tidal action to the site and to allow the site to aggrade naturally. Because the restoration relies on natural processes and the inherent dynamic nature of tidal wetland ecosystems, the structure or function of the marsh at various states in its development cannot accurately be predicted. The performance

TABLE 4. Summary of Objectives, Success Criteria, Performance Standards, and Monitoring Attributes for the Tidal Wetlands Mitigation Project

Objectives	Success Criteria	Performance Standards	Monitoring Attributes
Restore elevations suitable for the establishment of tidal marsh community	Trend of sediment accumulation toward achieving MHHW elevation by year 15.	An average annual sedimentation rate of at least 0.75 feet.	Annual sedimentation rate.
Restore unmanaged full tidal regime	Tidal elevations comparable to reference tidal elevations for the last 3 years of the monitoring program.	Tidal elevations within the site comparable to reference tidal elevations by year 1 and for each year during the monitoring period.	Tide elevation at high (feet NGVD) and low (feet NGVD) tides.
Establish 10 acres of a tidal marsh community by natural colonization	Trend toward achieving the establishment of 10 acres of a wetland plant community by year 15.	Minimum extent of vegetated area on the developing marsh plain: Year 3 3% Year 5 5% Year 7 10% Year 9 15% Year 10 30%	Total percent cover of vegetation.
	Dominant plant community species composition comparable to reference condition within 10 years	Dominant plant species comparable to those in the reference marshes at comparable elevations in years 7, 9, and 10.	Plant species composition.
		Relative percent cover of broad-leaf peppergrass in mitigation site not to exceed relative percent cover of broad-leaf peppergrass in reference wetlands by more than 10%.	Relative percent cover of broad-leaf peppergrass.
Create habitat for the western snowy plover	Create a minimum of 1.5 acres of potential nesting habitat for the western snowy plover by year 1.	Provide a minimum of 1.5 acres of potential nesting habitat for the western snowy plover within year 1 thereafter.	Acres of potential habitat.
	The site is used by members of the shorebird guild during 3 consecutive years in the last 5 years of the monitoring program (years 5 through 10).	Use of the site by members of the shorebird guild by year 2.	Shorebird species composition.
		Consistent use of the site by members of the shorebird guild during years 6 through 10.	Frequency of shorebird occurrence.

standards for this project are based on literature review of tidal wetland structure and function, assessments of tidal brackish wetlands in the vicinity, and review of other tidal restoration sites in the Bay Area.

Reference conditions will be used: (1) to account for natural variability within a year and between years, (2) as a benchmark to assess the development of the site and to trigger certain remedial measures, and (3) to support reasonable adjustments in the performance measures for more accurate and realistic evaluations of performance, as appropriate (Hymanson and Kingma-Rymek 1995).

6.1.1 Sedimentation

Because the existing surface is at approximately -3.0 feet NGVD, about 4 feet of sediment is needed to restore the pond surface to the lowest elevation at which vegetation may become established. Approximately 8 feet of sediment accumulation is needed to restore the future marsh plain elevation to the MHHW level (approximately 4.6 feet NGVD). Deposition rates are nonlinear. Rapid initial deposition rates decrease as the elevation approaches the equilibrium marsh plain level at about MHHW (Krone 1993). Sediment deposition also varies spatially, with more rapid accretion near the levee breach and in quiescent zones.

Deposition rates at the Alviso Marina, located in the Alviso Slough adjacent to the mitigation site, have been used to estimate a reasonable time frame for sediment deposition. Following two separate dredging events at the Alviso Marina, 7 feet of sediment were deposited within the first 3 to 4 years. Fifteen years after the second dredging, extensive sedimentation had occurred and slough channels had developed.

It is anticipated that the marsh plain will progressively increase over a 15-year period as sediment accretes at the mitigation site.

Objective (1):	Restore elevations suitable for the establishment of a tidal marsh community.
Performance Standard 1:	An average annual sedimentation rate of at least 0.75 feet.

6.1.2 Hydrologic Regime

The following tidal characteristics occur in the vicinity and are expected at the site (NOAA and the Corps as reported by Philip Williams & Associates, Ltd. 1997):

Tide Level	Feet (NGVD)
Mean Higher High Water	4.6
Mean High Water	4.1
Mean Low Water	-3.2
Mean Lower Low Water	-4.4
Estimated Lowest Tide	6.9

Objective (2): Restore an unmanaged full tidal regime.

Performance Standard 2: Tidal elevations within the site comparable to reference tidal elevations (between approximately -4.4 feet NGVD at MLLW and 4.6 feet NGVD at MHHW) by year 1 and for each year during the monitoring period.

6.1.3 Plant Community

Localized vegetation establishment is predicted to first occur along the site margins having the appropriate initial elevations within about 3 years. Based on the initial elevation at the mitigation site and the history of sedimentation and revegetation processes at the Alviso Marina, it is expected that during the next 5 to 7 years vegetation establishment would expand to areas where sediment deposition is most rapid. Complete revegetation is expected to occur 10 to 15 years following restoration of full tidal action. The fully-developed site is expected to consist of a vegetated marsh plain interspersed with tidal sloughs. Broad leaf peppergrass, which is an invasive nonnative plant species, occurs in the reference marshes (estimated to be less that 1 percent of relative cover) and can be expected to occur to some extent within the mitigation site.

Information on the elevation range over which the anticipated key species occur and are dominant is derived from the reference marshes adjacent to the site:

Scientific Name	Range of Occurrence (Feet NGVD)	Elevations of Dominance (Feet NGVD)
Scirpus californicus	0.4 to 4.6	0.4 to 3.8
Scirpus robustus	1.36 to 5.9	4.0 to 5.0
Typha sp.	3.0 to 5.9	4.5

Objective (3):	Establish 10 acres of a tidal marsh community by natural colonization
Performance Standard 3a:	Minimum extent of vegetated area on the developing marsh plain:

Year 3	3 percent
Year 5	5 percent
Year 7	10 percent
Year 9	15 percent
Year 10	30 percent

Performance Standard 3b:	Dominant species composition comparable to that in the reference marshes by year 7.
Performance Standard 3c:	Relative percent cover of broad-leaf peppergrass in mitigation site not to exceed relative percent cover of broad-leaf peppergrass in reference wetlands by more than 10 percent.

6.1.4 Wildlife Habitat

The improved portion of the levee forming the northern boundary and the new levee forming the eastern boundary will be managed to provide nesting habitat for the western snowy plover.

Objective (4):	Create habitat for western snowy plover
Performance Standard 4a:	Provide a minimum of 1.5 acres of potential nesting habitat for the western snowy plover within year 1.
Performance Standard 4b:	Use of the site by members of the shorebird guild by year 2.
Performance Standard 4c:	Consistent use of the site by members of the shorebird guild during years 6 through 10.

Wildlife species other than western snowy plovers are expected to occur at the site throughout the duration of the monitoring program. The restored marsh system may also benefit other sensitive species not specifically targeted by the mitigation project, including California least tern, California clapper rail, salt-marsh common yellowthroat, black rail, and the salt-marsh song sparrow. Anecdotal observations on these and other species will be made to gather information on general use of the site by wildlife.

6.2 Monitoring Methods

The attributes selected for the monitoring program will indicate the progress toward meeting the success criteria. In addition to quantitative monitoring for performance criteria, additional qualitative observations will be recorded for some attributes.

6.2.1 Reference Sites

Two reference marshes located adjacent to the site (Figure 5) will be monitored in year 7, 9, and 10. The vegetation monitoring protocols used at the reference sites will be the same as those used at the mitigation site to assess the development of the site in relation to the plant community performance standards. The reference sites may also be monitored for the purpose of identifying appropriate contingency measures.

6.2.2 Tidal Regime

Continuous tide recorders will be placed at the site to record water surface elevations (NGVD) and the extent of tidal circulation throughout the site. One tide recorder will be placed outside the breach (reference location), a second recorder will be placed immediately inside the breach, and a third recorder will be placed at a location within the mitigation site furthest from the breach. No appreciable gradient occurs at the site, so stations placed at intermediate locations are not needed. The data logger will be programmed to record in NGVD at 1-hour intervals. Approximately once per month, the data loggers will be downloaded and a visual inspection will be made to ensure that they are operating properly. The tide recorders will be referenced to the Corps' Tidal Benchmark No. 4549 located downstream of the site in Guadalupe Slough.

6.2.3 Sedimentation Rates

Permanent monitoring sites for recording sedimentation rates will be established at a minimum of five stations across the site. Location of the sites will be fixed using Global Positioning System. Feldspar will be applied as a baseline horizon marker material at each monitoring station. Sediment cores will be taken at the monitoring stations annually to measure the accretion rates. It may be necessary to conduct some initial experimentation to determine the most effective method for depositing the marker horizon through the water column. Annual rates of accretion will be averaged beginning in year 3.

6.2.4 Vegetation

Vegetation monitoring will be done on the developing marsh plain to record the establishment of the marsh plant community and to evaluate the extent of broad leaf peppergrass colonization.

False color infrared or color aerial photos at a scale of 1:1200 (1"=100') will be taken of the mitigation site at low tide in August in years 3, 5, 7, 9, and 10. The extent of vegetated area will be calculated as a percent of the developing marsh plain area. The major vegetation associations, designated by dominant and subdominant species, will be identified during field surveys and their boundaries delineated onto aerial photographs beginning in year 7. Occurrences of broad leaf peppergrass populations will also be delineated onto the aerial photographs and a calculation will be made of its relative percent cover. The reference marshes will also be monitored using this approach beginning in year 7.

6.2.5 *Wildlife*

The use of the site by shorebirds will be monitored bimonthly between mid-April and mid-August beginning in year 2. Visual surveys of bird activity will be made by walking levees adjacent to the site, when passable, and when conditions are conducive to observing birds. Species composition, abundance, and general observations of habitat use will be recorded.

6.2.6 *Other Monitoring and Documentation*

Photopoints

The development of the site will be documented from ground photopoints. Annual photographs will be taken in August from a minimum of four permanent locations beginning in year 1 and continuing through the monitoring program. Photopoint locations will be identified by compass reading (direction) and by permanent markers in the field (location).

Tidal Slough Development

The extent and character of tidal channel development will be monitored to ensure that a network is developing that will provide for complete inundation and drainage as the marsh plain evolves. The development of tidal channels will be monitored qualitatively from aerial photographs at a scale of 1:1200 (1" = 200') taken at low tide in August beginning when the slough channels start to form.

Wildlife Use

Use of the site by wildlife will be noted during the shorebird monitoring. The identity and approximate number of all species observed will be recorded, tallied, and summarized in the annual report as anecdotal observations.

Mosquito Populations

Mosquito populations will not be monitored as part of this mitigation program. Because the site is expected to provide suitable breeding habitat for the mosquitoes, the Santa Clara County Vector Control District (County) may periodically monitor mosquito populations at the site. The District will work with the County to identify appropriate mosquito control measures that are consistent with the goals and objectives of the Plan.

6.3 Annual Reports

Monitoring reports will be prepared annually for a period of 10 years following the introduction of tidal flows. Analyses of quantitative monitoring data will be provided, as well as summaries of qualitative data and relevant anecdotal observations. Photographs and maps identifying monitoring areas will be included. Comments on any problems that may interfere with the success of the mitigation and proposed contingencies will also be outlined.

6.4 Schedule

The monitoring schedule is presented in Table 5. The initiation of monitoring will be linked to the actual date that construction is completed. The first annual report will be submitted by March 1 after the first calendar year following the completion of construction.

TABLE 5. Monitoring Schedule for the 1997 Urgent Sediment Removal Project Tidal Wetlands Mitigation

Monitoring Task	2000 Yr 1	2001 Yr 2	2002 Yr 3	2003 Yr 4	2004 Yr 5	2005 Yr 6	2006 Yr 7	2007 Yr 8	2009 Yr 9	2009 Yr 10
As-Built Plans	▨									
Photopoints	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨
Tidal Regime		▨	▨	▨	▨	▨	▨	▨	▨	▨
Sedimentation Rate		▨	▨	▨	▨	▨	▨	▨	▨	▨
Wildlife		▨	▨	▨	▨	▨	▨	▨	▨	▨
Vegetation			▨		▨		▨		▨	▨
Slough Channel Development							▨	▨	▨	▨

7.0 COMPLETION OF MITIGATION

7.1 Notification of Completion

It is anticipated that 10 to 15 years will be required to achieve a tidal marsh that functions similar to the adjacent reference marshes. After 10 years or when the success criteria have been met, a final report will be prepared. The report will provide a rationale for achieving a successful mitigation, an evaluation of any corrective measures, and a current jurisdictional determination of the restored wetland area.

7.2 Corps Confirmation

Following submittal of the Notification of Completion Report, the Corps may conduct a site visit to confirm that the mitigation requirements have been met.

8.0 CONTINGENCY MEASURES

8.1 Initiating Procedures

An adaptive management approach will be used throughout the duration of the mitigation program. Data will be collected to document the development of the marsh system, problems will be identified, new restoration techniques may be tried, and corrective measures will be made as appropriate. In the event a performance standard or success criteria is not met, an analysis of possible causes will be made and remedial measures will be implemented, as appropriate. In some cases, studies beyond those identified in the monitoring plan may be needed to determine the cause for a problem. A summary of the analysis and remedial measure taken will be included in the annual monitoring report.

8.2 Remedial Measures

Some examples of possible contingency measures are provided below. Alternative solutions to those provided here might be more appropriate.

1. Widen, deepen, or otherwise modify the breach area as necessary to improve the exchange of water onto the site if significant ponding or blockage in the area of the breach occurs or if there is damping of the tidal cycle.

2. Excavate a tidal drainage network if the site is draining poorly due to insufficient erosion during marsh plain evolution.

3. Implement a planting program for bulrush or other species if, after suitable conditions are established for colonization, native species do not become established, or colonization is slower than the performance standards indicate.

4. Implement a control program for invasive plant species for the wetland site and the snowy plover habitat.

5. Place dredged materials on the site to raise the marsh plain elevations if the sediment accretion rate is slower than anticipated.

8.3 Alternate Locations for Contingency Mitigation

The proposed mitigation site is a suitable environment for restoring the desired habitat and can be expected to meet the mitigation goal. Therefore, no alternative location has been identified at this time. Should monitoring indicate that the site is at risk for not meeting the goal and appropriate remedial measures have not been successful, identification of an alternative mitigation site may be appropriate.

8.4 Funding Mechanism

The District will provide the funding for planning and implementing necessary contingency measures.

8.5 Responsible Parties

The District will be responsible for implementing contingency measures. The contact will be Ms. Louisa Squires, Wetlands Specialist, Santa Clara Valley Water District, 5750 Almaden Expressway, San Jose, CA 95118-3686, (408) 265-2600, extension 2745.

PART V. REFERENCES AND PERSONAL COMMUNICATIONS

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